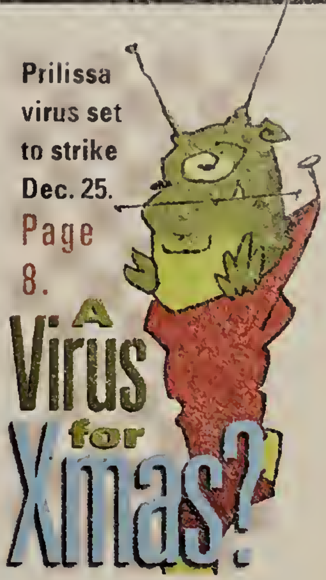
DITCHING DSL What's behind Cabletron's decision to sell off its digital subscriber line business? Page 6.

BEYOND NETWARE 5 Novell revs up a network operating system for Intel's Itanium processor. Page 8.

The newsweekly of enterprise network computing

NetworkWorld

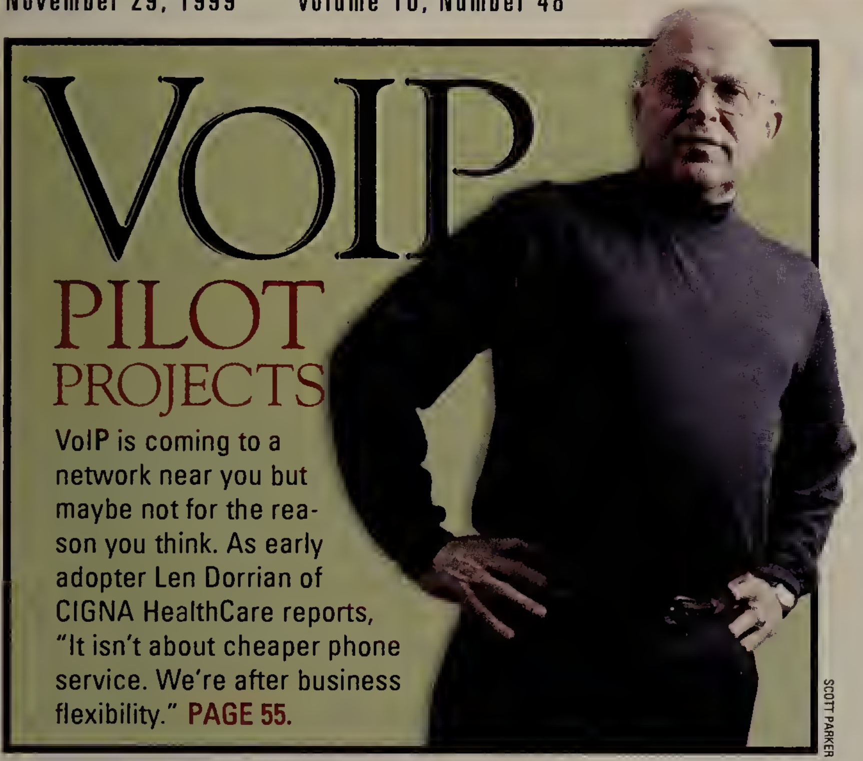


Prilissa virus set to strike Dec. 25. Page 8.

A Virus for Xmas?

November 29, 1999 Volume 16, Number 48

The network portal: www.nwfusion.com



VoIP PILOT PROJECTS

VoIP is coming to a network near you but maybe not for the reason you think. As early adopter Len Dorrian of CIGNA HealthCare reports, "It isn't about cheaper phone service. We're after business flexibility." **PAGE 55.**

SCOTT PARKER

NW poll: ASPs show strength despite doubts

BY NETWORK WORLD STAFF

Network professionals are still skeptical about application service providers (ASP), but a new *Network World* survey shows there is also a groundswell of support for ASP offerings that has the potential to turn into a major wave.

Roughly one in five respondents said they are already using some kind of ASP service — not bad for a concept that has only emerged over the past year or two. What's more, one-third of respondents who are not using ASPs seem ready to give application outsourcing a chance. And most of these same respondents expect they will give ASPs a shot by the end of next year (see Figure 1, page 80).

The survey, based on interviews with about 300 network professionals, found that companies are turning to ASPs for a host of reasons that range from difficulties in retaining

See **ASPs**, page 80

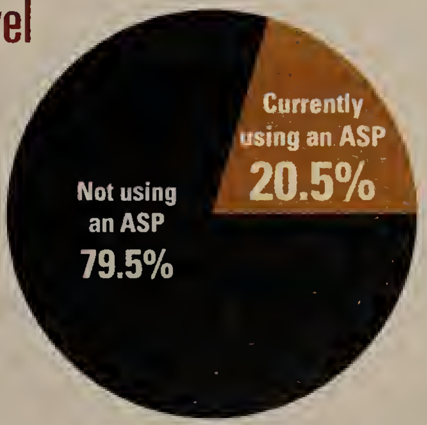
ASP REALITY CHECK

Last in a four-part series.

ASP acceptance level

About one in five companies surveyed are outsourcing applications to an ASP.

Respondents: 288



SOURCE: NETWORK WORLD READER SURVEY

www.nwfusion.com

ALL ABOUT ASPs

Download the complete survey results.

Try our new ASP search engine.

find it DocFinder 5730 online

BadgerNet takes big bite out of Wisconsin's costs

BY TIM GREENE

MADISON, WIS. — The state of Wisconsin last week installed its 1,385th T-1 access line to BadgerNet, closing in on the end of a three-year effort to connect state agencies, schools and municipalities to the new, cost-effective statewide ATM-over-SONET backbone.

The sprawling private network reaches even the smallest Wisconsin towns — potentially 5,500 sites in all — and in many cases costs agencies and schools a third of what

See **BadgerNet**, page 12

Christopher Alberts, Loren Lamphear and Marcy Egges have teamed up to build Wisconsin's ATM and SONET net.

CHURCHILL + KLEHR

MCI WorldCom, Sprint tout T-1 deals

BY DAVID ROHDE

WASHINGTON, D.C. — Pressured by intense competition, growing fiber availability and looming competition from digital subscriber line (DSL), the dike is beginning to break on rates for T-1 and other dedicated-access services from major carriers.

MCI WorldCom and Sprint last week confirmed that they have each instituted radically simplified national pricing plans for local dedicated loops, even in areas where they don't own the facilities and have to buy them from Bell companies.

The result: local T-1 rates as low as $200 per month and a price structure that eliminates cumbersome mileage measurements — or hunting down rates based on individual telephone exchanges in tariff tables.

MCI WorldCom's program, which applies to orders placed through Dec. 31, offers a single national flat rate of $285 per month for all T-1 local access lines and $150 per month for all 64K bit/sec lines, regardless of geography or mileage to the MCI point of presence.

The promotion is available

See **T-1s**, page 16

Newspaper $5.00

SOO

With the rise of the Internet, there has been some speculation as to the role Microsoft will play.

Surprisingly (to some), Microsoft has not gone the way of the brontosaurus. The proof? Microsoft® Windows® DNA, our comprehensive platform for easily building distributed Web apps today. More proof? There are more Web sites (including Ask Jeeves, drugstore.com, Dell.com, and Nasdaq®) running on our platform than any other, including Sun Solaris.*

The Windows DNA platform includes Internet-enabled tools you know today, such as the Visual Studio® 6.0 development system and Microsoft SQL Server™ 7.0, combined with Windows 2000, an Internet-scale OS with Web services and functionality built in. Add the info and how-to help you can get from MSDN™, and you've got a real, productive, ready-right-now Web development platform. For all things Windows DNA, go to msdn.microsoft.com/windowsdna

* Netcraft Survey (September 1999).

© 1999 Microsoft Corporation. All rights reserved. Microsoft, MSDN, SQL Server, Visual Studio, Windows, and *Where do you want to go today?* are either registered trademarks or trademarks of Microsoft Corporation in the United States and /or other countries. Dell.com is a registered trademark of Dell Corporation. Ask Jeeves, drugstore.com, Nasdaq, and Sun Solaris are either registered trademarks or trademarks of their respective owners.

Microsoft® Windows® DNA

Where do you want to go today?® Microsoft®

To find out how well our backup software works with Oracle, why not ask one of our customers:

“Oracle's strong relationship with VERITAS Software supports our commitment to providing the fastest, most available e-business solutions at the lowest cost. VERITAS Software provides Oracle and its customers with cross platform storage management solutions that ensure efficient and reliable access to data.”

-Gary Bloom, Executive Vice President, Oracle

What software does Oracle use to backup their critical production systems? The one that's optimized for Oracle databases, as well as many supported platforms, including Windows NT and UNIX. The one that centralizes backup and recovery control, and lets them manage all backup operations on the planet with Global Data Manager (GDM).

Presenting NetBackup for Oracle. Oracle wouldn't trust their databases to just any backup software. And neither should you. Call 1-800-729-7894, ext. 83517, or surf www.veritas.com for more information.

VERITAS is a registered trademark of VERITAS Software Corporation in the US and other countries. The VERITAS logo, Business Without Interruption and VERITAS NetBackup are trademarks of VERITAS Software Corporation in the US and other countries. Other product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

BUSINESS WITHOUT INTERRUPTION™ VERITAS

NetworkWorld Fusion
www.nwfusion.com

THIS WEEK ONLINE

Calling the women of IT. Where are the women of IT? Amid a worsening labor shortage, fewer women are entering the profession, but why? We've got experts online all week to give you the answers:

- Nancy Ramsey, co-author of *Futures of Women & Scenarios for the 21st Century.*

- Linda Scherr, program director for IBM's Women in Technology department.
- Kitty Didion, executive director of the Association for Women in Science.
- Dr. Arthur Bienenstock, associate director for science for the White House Office of Science and Technology Policy.

- The Honorable Kelly Carnes, assistant secretary for technology policy with the Department of Commerce.
- Dr. Malgorzata Pfabe, head of the new engineering department at Smith College.

So head into our forum and tell us what you think. **DocFinder: 5728**

And when you're done talkin' . . . Check out the extensive resources we've gathered for you:

- 50/50 by 2010: A Consortium to Realize Female Potential in Science and Engineering.
- America's New Deficit: A report on the shortage of information technology workers.
- An analysis of the workplace gap in Silicon Valley.
- Trailblazing: One Woman's Trek in Science, by Rita Colwell.
- The Institute for Women in Technology.

DocFinder: 5733

Then take out your calculators. Make sure you drop in on our 1999 Salary Survey. Our Salary Calculator will help you figure out where you land on the pay scale of professionals like yourself. **DocFinder: 3925**

NetworkWorld

Table of Contents

NOVEMBER 29, 1999

Francis Saucedo says there's no substitute for learning a new skill on real equipment. Page 67.

NEWS

6 Cabletron offloads DSL subsidiary FlowPoint and plans to offer partner products.

8 Dangerous Prilissa virus on the loose.

8 Novell's 64-bit network operating system to roll out in pieces.

10 NetVision on the Y2K watch for NDS users.

10 E-comm companies tackle high-volume e-mail, online catalogs.

12 Wisconsin video network rides low-priced DS-3s.

16 With Colorstamps.com, it pays to click.

INFRASTRUCTURE

21 Vendor certification: Does anyone care?

21 Linux continuing on course to woo enterprise net customers.

22 Madge token-ring switch embraces IP.

25 Kevin Tolly: There's something about Cisco.

CARRIERS & ISPs

29 Voice-over-DSL trial passes muster.

29 Compaq, Cable & Wireless pair to pitch ASP wares.

34 David Rohde: MCI WorldCom, Lucent kiss and make up.

ENTERPRISE APPLICATIONS

37 Videoconferencing takes to the Web.

40 Review: Wrestling the NT management octopus.

44 Scott Bradner: Tapping the Internet.

TECHNOLOGY UPDATE

49 How to give DSL concentrators a boost.

50 Gearhead: In case of emergency — FTP.

MANAGEMENT

67 Hands-on learning: Online training lets students tinker in real network equipment.

OPINIONS

52 Editorial: This line is your line, this line is my line.

53 Ira Brodsky: How the Internet could save your life.

53 James Kobielus: Self-destructing e-mail — pragmatic or paranoid?

82 Backspin: Eye to eye with the cat network.

82 'Net Buzz: Expressing thanks for a bounty of reader mail.

Net Know-It-All ....Page 10
Ask Dr. Intranet ....Page 49
Message Queue ....Page 52
Editorial and advertiser indexes ......Page 79

Special Focus

XML: E-COMM'S NEW LOOK

Users, vendors bonding to develop common XML procedures. Page 48.

HOW TO CONTACT US

WRITE: Network World, 161 Worcester Road, Framingham, MA 01701; CALL: (508) 875-6400; **FAX:** (508) 820-3467; E-MAIL: nwnews@nww.com; **CIRCULATION:** CALL: (508) 820-7444; FAX: (508) 270-8869; E-MAIL: nwcirc@nww.com; **STAFF:** See the masthead on page 16 for more contact information. **REPRINTS:** (717) 560-2001

FEATURES

SCOTT PARKER

VoIP REALITY CHECK

VoIP is coming to a network near you but maybe not for the reason you think. As early adopter Len Dorrian of CIGNA HealthCare reports, "It isn't about cheaper phone service. We're after business flexibility." PAGE 55.

New columnist Dave Passmore recommends against new ATM implementations in the LAN. Page 61.

REVIEW:

We put four video servers to the test and RealNetworks' RealSystem G2 comes out the clear winner. Page 63.

NEWS BRIEFS, NOVEMBER 29, 1999

AT&T to 'untether' wireless

AT&T is expected soon to announce that it will split its booming wireless business into a separate tracking stock. The move would parallel Sprint's success in maintaining a separate stock for its Sprint PCS unit, which helped boost Sprint's overall valuation to a record $115 billion, which MCI WorldCom agreed to pay for the entire company. Even at that, AT&T's wireless business volume is triple Sprint's, partly because it includes personal communications services and traditional cellular. As part of the wireless initiative, AT&T is also expected to reveal how it is reviving its long-dormant Project Angel, which provides fixed-wireless local loop connections as a path around Bell company local connections.

AOL NetMail gets makeover

AOL last week announced a new name and upgrade for a 2-year-old service that lets subscribers access their e-mail accounts from any PC with a browser and online access. AOL Mail on the Web is the new name for AOL NetMail. Though people who used NetMail 2.0 in the past will notice little change, the company says AOL made some improvements to address scalability and accessibility on the back end before deploying Mail on the Web.

BBB drafts online 'code'

The Better Business Bureau (BBB) last week released the draft version of "The Code of Online Business Practices." The 15-page document details how to conduct business electronically according to five basic principles that include adhering to a privacy policy and successfully resolving disputes. The BBB, which posted the draft document at www.bbb.org, would like comments on the draft before releasing "The Code of Online Business Practices" in January.

Microsoft legal saga continues

Three more class-action lawsuits were filed against Microsoft last week in the wake of a federal judge's finding that supports government accusations that the company is a monopoly. Two suits were filed in Ohio — one in state court and the other in U.S. District Court — and another was filed in Superior Court in San Francisco. In the Ohio suits, lawyers claim consumers were overcharged by $10 billion. Also last week, U.S. District Court Judge Thomas Penfield Jackson, who presided over the government antitrust case, said this is a good time for a negotiated settlement of the case, according to a report in the *Wall Street Journal*. On Nov. 19, Jackson appointed Judge Richard Posner, head of the U.S. Court of Appeals in Chicago, as a mediator in the case.

Cabletron to pitch new switches

Cabletron next month will offer private-labeled versions of Sonoma Systems' integrated access devices. The Cabletron SmartSwitch 1500 line features a fixed configuration switch and a modular ATM access switch that each provide inverse multiplexing of ATM and circuit emulation services for integrated voice and data transmission. The products will compete with 3Com's PathBuilder S310 and 330 WAN switches, and Cisco's MC3810.

IBM plans testing center

IBM has plans to expand support for its newly acquired NUMA-Q server brand from Sequent with the development of an $8 million testing and integration center. The center, which IBM says will be open for business in December, is designed to give IBM customers and business partners a place to plan, develop and test customer relationship management, enterprise resource planning and supply chain management systems.

Intel makes telephony moves

Intel is broadening its horizons in the computer telephony market by acquiring privately held Parity Software Development, as well as making investments in MediaSoft Telecom and PRIMA, through its Intel Communications Fund. Intel also signed a letter of intent with Artisoft, to work on several computer telephony-related projects. Financial details were not disclosed.

Dell has new wireless wares

Dell last week took a decisive step into the realm of wireless technology, announcing plans to sell a two-way pager and offer wireless network connections for LANs to corporate desktops and notebooks. The PC vendor says it will sell a "BlackBerry" wireless handheld device that can be worn on a belt and offer secure, two-way e-mail throughout the U.S. Dell also says its network technology, the Aironet 4800 Series, is now available for its corporate OptiPlex desktops and Latitude notebooks. The wireless LAN product requires network interface cards and access points.

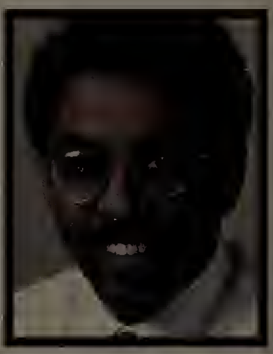
Cabletron cedes DSL

Sells FlowPoint subsidiary to Efficient Networks.

BY JIM DUFFY

ROCHESTER, N.H. — Cabletron's sale of its digital subscriber line router subsidiary not only means the vendor is no longer a primary supplier of DSL gear, but it also may signal the divestiture of noncore assets in preparation for a possible sale of the company.

Cabletron last week announced that it has reached an agreement to sell its FlowPoint DSL subsidiary to Efficient Networks of Dallas for $860 million in stock. Cabletron will now sell Efficient's existing and newly acquired customer premise DSL modems and routers under an OEM arrangement.


COO Pereira cites need to focus on "core products."

"Interesting," says Cabletron customer Brandon Ross, director of network engineering for MindSpring Enterprises in Atlanta. "We receive excellent service and support from Cabletron. I hope that the new owner of FlowPoint continues to provide such a high level of service."

The FlowPoint sale follows by a few months the quiet closing of Cabletron's DSL Access Multiplexer (DSLAM) operations. Cabletron obtained DSLAM capabilities through its acquisition last summer of Ariel's Communication Systems Group for $33.5 million. Last summer, Cabletron also paid $25 million for the remainder of FlowPoint it didn't already own.

In shuttering its internal xDSL operations, Cabletron is attempting to focus on core offerings for the enterprise and service provider markets, such as its high-end, high-margin SmartSwitch Routers, company executives say. Cabletron is also looking to maximize shareholder value in an industry that has seen the market capitalization of start-ups rocket past Cabletron even though they have a fraction of the company's revenue.

"Our goal going forward is to focus more on our core products that deliver higher margins," says Romulus Pereira, Cabletron's chief operating officer. "For Cabletron, the focus is moving out of just the DSL segment of the market into more of a higher-end play that involves our core routers."

Cabletron will try to hone this focus further by divesting itself of other assets that are not core to the company's strategy or product offerings.

"Our goal is to figure out what the product sets are that don't maximize our potential," Pereira says. "We'll exit out of all the products that don't make sense."

But DSL was supposed to have made sense only about a year ago when Cabletron stated that the technology was vital for its push into the service provider market, which was designed to broaden its revenue base. Pereira, however, stresses that Cabletron is not exiting the DSL business but rather focusing internal R&D on more-strategic offerings.

Observers suggest that selling FlowPoint and other noncore assets may indicate that Cabletron is dressing itself up to be sold. The firm's CEO, Piyush Patel, did not deny that, but offered a different perspective.

"We're really bringing the focus back to our core business," he says. "We are unlocking the shareholder value, but the whole strategic rationale behind this is that we are not exiting the DSL business, we are committed to the DSL business. But going alone is not our strategy."

But if Cabletron's core offering is the SmartSwitch Router, analysts say the company has its work cut out, given the dominance of Cisco in the market and the cutting-edge technology from start-ups like Juniper.

"So what is their telco/ISP/carrier strategy?" asks Craig Johnson, principal of The Pita Group in Portland, Ore. "If it is just routers then they are fighting a losing battle in the longer run." ◪

A good sign for building e-anything.

Welcome to the e-business economy. As an IT manager you have to implement all the new applications while keeping the LAN open and flexible to change. Tall order? Not if you have 3Com's® LAN solutions. They support the highest level of mission critical availability with end-to-end policy management to simplify network administration. And since they're built ready for convergence, you'll be open to anything. Visit www.3com.com/lan_solutions to learn more about why it pays to be connected.

eNetworks

Another e-Network solution from 3Com.

© 1999 3Com Corporation. 3Com, the 3Com logo, SuperStack and CoreBuilder are registered trademarks and More connected. is a trademark of 3Com Corporation.

3Com® More connected.™

Dangerous virus on the loose

But Prilissa should do little harm if Melissa antivirus updates are installed.

BY ELLEN MESSMER

Like the Grinch that stole Christmas, a new computer virus called Prilissa is spreading across the Internet, carrying a dangerous payload that will wipe out any victim's hard drive on Dec. 25 if it has the chance.

The good news is that your company's computers should be safe from the virus as long as you installed the right update to your antivirus software when the notorious Melissa virus struck earlier this year. The major antivirus software companies have also issued updates that specifically target Prilissa for those customers that want to feel extra safe.

Prilissa represents the most dangerous variant yet on the Melissa macro virus, which spread quickly last March by stealing 50 addresses out of each victim's Outlook Express directory and mailing itself off. When recipients opened attachments in those messages, their systems were infected.

The copycat Prilissa virus looks a lot like the so-called Pri virus, which can infect a local computer with a payload that can wipe out files on the hard drive when a computer is booted up. Prilissa's Christmas Day detonation is set to impact computers running Windows 95 and higher, but not NT.

The virus is set to unfold with the crudely phrased message "Vine . . . vide . . . vice . . . Moslem Power Never End . . . You Dare Rise Against Me . . . The Human Era is Over, the CyberNET Era has come."

"It's probably just someone trying to get attention," says Vincent Weafer, director of Symantec's antivirus research center.

While Prilissa so far shows little sign of reaching a Melissa-level epidemic, about a dozen corporations last week contacted Network Associates to report Prilissa sightings.

Corporations that had e-mail servers crippled and networks clogged for a few days during Melissa's rampage say they learned their lesson the hard way about the danger of computer viruses.

"Melissa kicked us in the butt, and it was hard to get rid of that virus," says David Byrkit, e-mail administrator at ITT Avionics in Clifton, N.J. "But in a way we're thankful it happened. Prior to that, we didn't use virus protection on e-mail servers."

After coping with Melissa's fallout, ITT Avionics "made it a corporate edict that anyone who didn't have antivirus software wouldn't be allowed on the Internet," Byrkit says.

"We got our virus signatures updated" when Melissa came around, says Blane Woodward, IS manager for Northwestern Mutual Life in Milwaukee. "We take [viruses] very seriously." ◪

> **"We made it a corporate edict that anyone who didn't have antivirus software wouldn't be allowed on the Internet."**
>
> David Byrkit, e-mail administrator, ITT Avionics

More

breaking news

Network World Fusion now has more news than ever. Check out these stories online:

The Internet economy gets a number check

Have you ever bought a .com stock and had a vague suspicion it was way overvalued? Well, a group of accountants has just justified that queasy feeling. A task force of bean-counters is questioning how these new companies report revenue. Because .com stock prices are based on revenue multiples (they have no profits), a decrease in revenue could mean a big drop in stock price. Can you say short?

DocFinder: 5734

Get your news here!

NetFlash delivers network news to your e-mail inbox, every day, free of charge. And it includes occasional flashes of wit. Sign up today, sit back and let the news come to you.

DocFinder: 3850

Sun, EMCA fall out over Java standardization

Sun, which loves to bash Microsoft for being proprietary, is itself playing fast and loose with standards — at least according to some. Sun made a well-publicized (everything it does is well-publicized) decision to make Java a thoroughly open standard. However, the company recently withheld an 8,400-page Java spec from ECMA, the organization charged with standardizing the technology. Sun says it will keep working with the group, but its lawyers need some time to bone up on a few matters.

DocFinder: 5735

Network World Fusion

www.nwfusion.com

Novell's 64-bit NOS to roll out in pieces

BY DENI CONNOR

PROVO, UTAH — Customers may be tired by now of hearing about Novell's 64-bit software plans, but the company has a few surprises in store this week.

Novell says it actually will ship a 64-bit edition of its Internet Caching System before it rolls out a 64-bit network operating system replete with file, print and directory services. Among the other surprises is that Novell is undecided about whether the company will even use the NetWare name for any of its new modular 64-bit offerings, of which a slew are reportedly planned.

The company has been discussing a 64-bit network operating system code-named Modesto for nearly two years while waiting for Intel to ship its Itanium processor. The processor, formerly known as Merced, is now slated to ship in mid-2000.

Other 64-bit systems

Novell is the sixth operating system vendor in the last month to demonstrate a 64-bit operating system on recently available Itanium prototypes, following Sun's Solaris, IBM's and The Santa Cruz Operation's 64-bit Monterey, Hewlett-Packard's HP-UX, the 64-bit Linux port (dubbed Trillian), and Microsoft's Windows 2000.

While these vendors are testing operating system versions that users may easily recognize, Novell is testing a stripped-down operating system, consisting of a kernel and a single service.

Novell's 64-bit software "is a brand-new set of code that is happening from scratch to exploit all the parallel features in the Intel Itanium processor," says Phil Karren, product line manager for NetWare at Novell. "We started out with a [minimal] operating system kernel and a caching service."

Novell's plan is to build more modular software that can be developed faster and introduced in smaller chunks. Services such as caching and directories will be able to tap directly into the stripped-down 64-bit operating system instead of running on top of a general services layer, reducing overhead and increasing performance.

Developers of Modesto software will also be able to use C/C++ tools and a Java Virtual Machine, which is expected to boost the performance of applications running on a 64-bit Web application server.

Novell will not immediately introduce a general-purpose 64-bit network operating system with file, print, directory and security services. But when it does, Novell expects that the network operating system will be backward-compatible with already installed versions of NetWare.

Advantage for larger users

The significance of a 64-bit network operating system is "bigger, better, faster," says Bob Sakakeeny of Aberdeen Group in Boston.

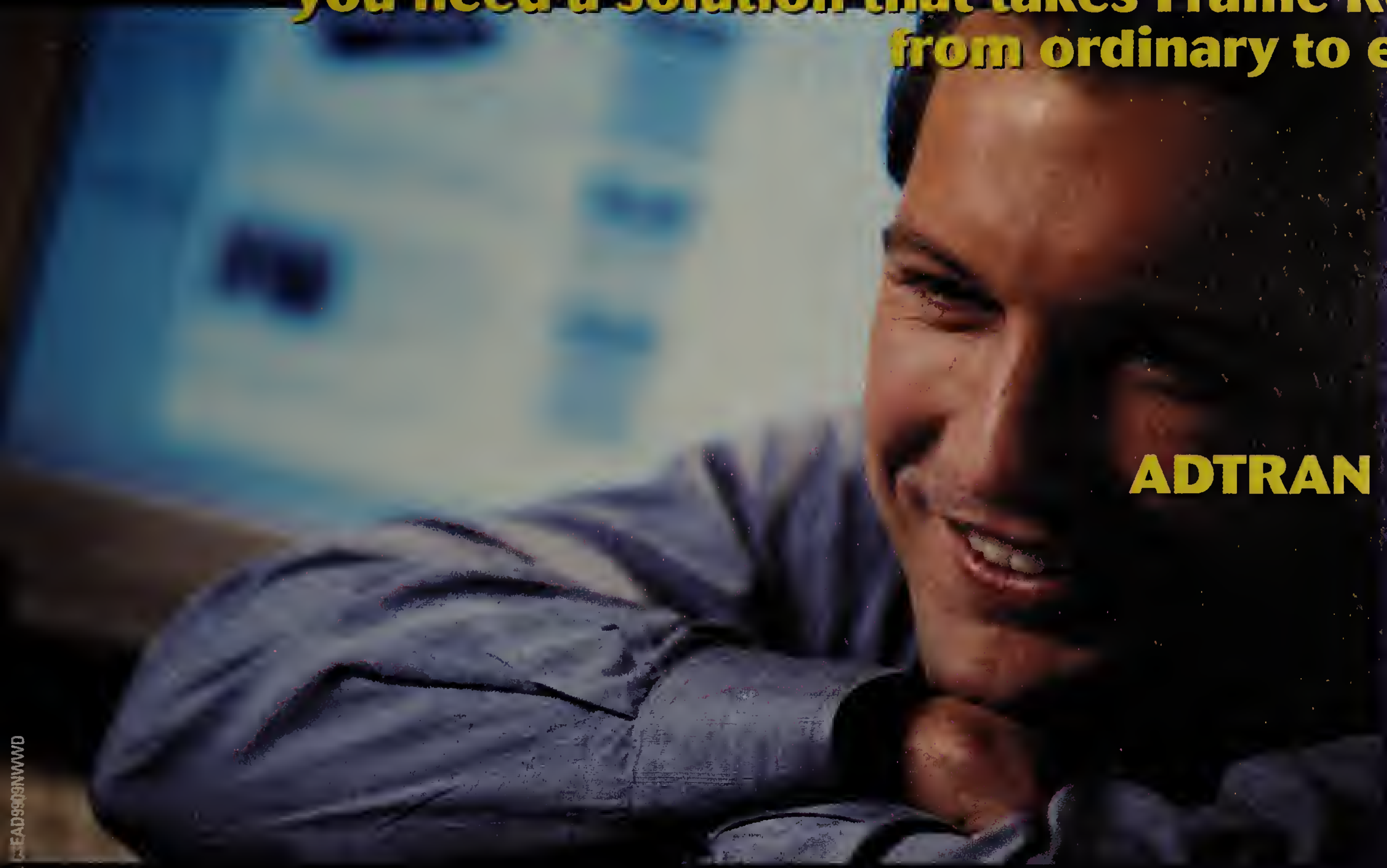
The advantages of faster processing and more scalability for applications such as caching or directory services will appeal to large corporate network users, ISPs and ASPs dealing with data- and transaction-intensive Web-based applications.

Traditionally, Novell has not been considered an applications server vendor and has not had the tools for Web application development.

Jamie Lewis of The Burton Group in Midvale, Utah, says that while NetWare trails Solaris, Windows NT and Linux by substantial margins in the Web application server space, Novell's future success may be in non-NetWare caching applications or high-end directory appliances, both applications that require very fast, scalable 64-bit platforms. ◪

WAN CONNECTIVITY SOLUTIONS T3 T1 E1 FRAME RELAY xDSL HDSL HDSL2 ISDN DDS WIRELESS

you need a solution that takes Frame Relay from ordinary to extraordinary.



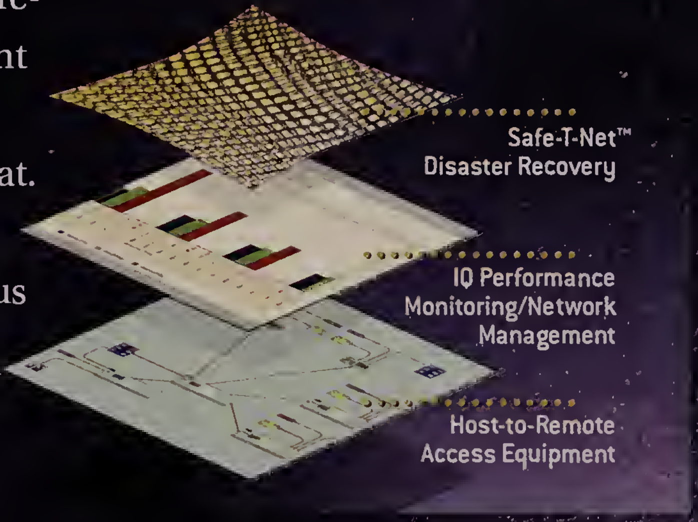
ADTRAN delivers.

ADTRAN Frame Relay

- Host-to-remote connectivity
- End-to-end visibility and control
- Network performance monitoring
- Service Level Agreement verification
- Network trend analysis
- Dependable dial-around-the-cloud protection
- SNMP compatible
- Multinational solutions

Powerful tools for Frame Relay connectivity, performance monitoring and disaster recovery.

Now, your Frame Relay network can be much more than a cost-reducing alternative to leased lines. With ADTRAN solutions, your Frame Relay network becomes a powerful, dependable infrastructure supporting the mission-critical telecom tasks your users demand. ADTRAN termination equipment satisfies virtually any type service connection at any location. Feature-packed performance monitoring and network management deliver control over packet-based variables. And affordable dial backup assures that your network won't miss a beat. This Frame Relay solution is secure and value-packed. And it's from ADTRAN—the name synonymous with wide area networking connectivity.


Safe-T-Net™ Disaster Recovery
IQ Performance Monitoring/Network Management
Host-to-Remote Access Equipment

Empower your Frame Relay network with ADTRAN connectivity solutions.

For a reseller near you, call **800 9ADTRAN** and ask to speak to a Channel Sales Representative. Or, visit *www.adtran.com/framerelay* to view application diagrams, a disaster recovery white paper, and more.

All ADTRAN wide area connectivity products are certified Y2K compliant.

Experts choose ADTRAN.™

ADTRAN

ADTRAN is a registered trademark of ADTRAN, Inc.

©1999 ADTRAN, Inc. All rights reserved. C-EAD9909NWWD

NetVision providing Y2K watch for NDS users

Directory Alert product monitors administrator-independent events, such as automatic updates or changes based on rules.

BY JOHN FONTANA

OREM, UTAH — Companies concerned that Y2K problems within their enterprise directories could have a ripple effect across their networks now have a new tool to put them more at ease.

NetVision last week began shipping Directory Alert, a real-time monitoring and alerting tool for Novell Directory Services (NDS). The tool monitors every object in the directory and reports on changes made to those objects. NetVision officials have tuned those features to uncover and address Y2K-related problems.

Key to Directory Alert is that it monitors events that happen without administrator intervention, such as automatic updates made by NetWare or changes based on rules set within the directory.

"The concern here is with complex systems that make changes based on dates," says Rick Villars, an analyst with International Data Corp., a market research firm in Framingham, Mass. "The directory is a particularly sensitive system because it has password and security information. There is no indication, however, that directories are more Y2K-vulnerable than other systems, but Directory Alert is another safety measure to build confidence."

Directory Alert's key to correcting Y2K issues is that it provides a detailed log of changes, including a record of what data was changed and what the data was before the change was made. The historical logging of data is designed to allow administrators to easily reverse alterations to the directory.

"This sounds like a good tool for tracking changes, especially in a large enterprise," says Harold Valenzuela, network administrator and NDS architect for Children's Home Society of California in Santa Ana. "We've been running a server a year ahead of current time, and we find NDS is operating fine, but we are not letting down our guard."

Directory Alert uses NetVision's Global Event Services (GES) technology, which monitors activity in NDS. GES is installed on every directory replica server that has read/write capability. The monitoring console, which reads the data collected from the GES, runs on a Windows NT workstation.

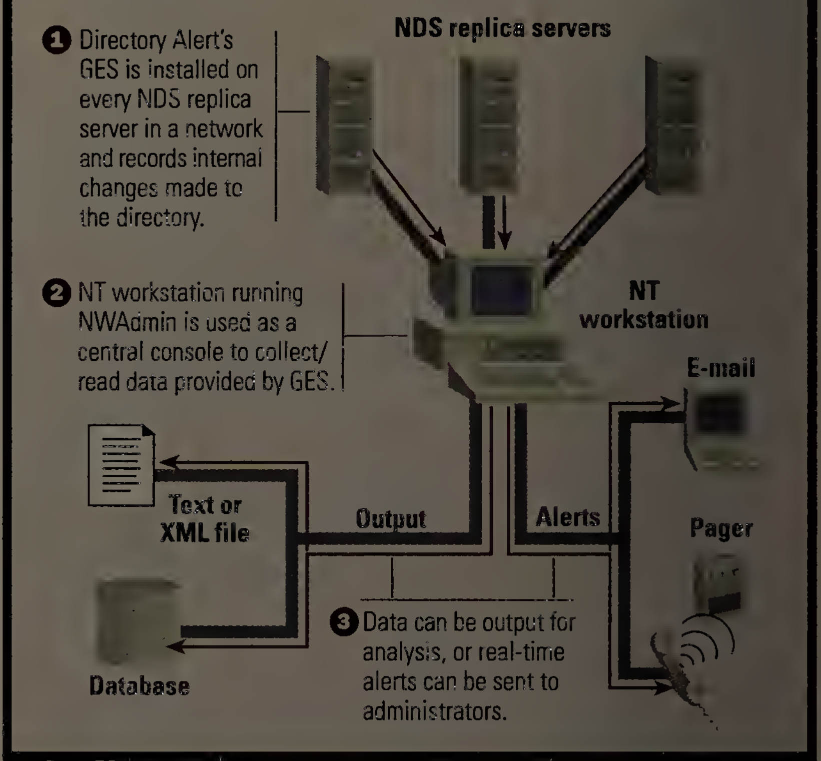
The data can be exported to a text file or database for analysis, but Directory Alert also can contact administrators in real time using e-mail or pagers.

Directory Alert is now shipping and is priced at $28 per user.

NetVision: www.netvision.com

Directory watchdog

Directory Alert tracks Y2K-related problems in NDS environments. The tool is based on NetVision's Global Event Services (GES) technology, which is installed as a NetWare Loadable Module.



❶ Directory Alert's GES is installed on every NDS replica server in a network and records internal changes made to the directory.

❷ NT workstation running NWAdmin is used as a central console to collect/read data provided by GES.

❸ Data can be output for analysis, or real-time alerts can be sent to administrators.

E-comm companies tackle high-volume e-mail, online catalogs

Start-up Banter Technology and OneSoft to ship respective products this week.

BY ELLEN MESSMER

Wells Fargo Bank boasts of having the most online banking customers, but it also admits that handling e-mail inquiries from these 1.3 million people is no easy chore.

At first, Wells Fargo wrote its own rules-based software for prescripted responses that customer service agents could draw upon to answer the flood of about 3,000 e-mail questions per day. Finding that system lacking, the bank looked for a faster alternative and tried a beta version of software called Rapport from start-up Banter Technology.

"We've been using this for about two months to help respond to e-mail," says George Cheng, senior vice president in charge of Wells Fargo's online banking services. "Once you have a knowledge base of responses to questions, Banter's software can look at each new message coming in and pick out the right response. It adapts by remembering what worked well and what didn't."

The Rapport software resides behind the public Web server and grabs each customer message to analyze its keywords and syntax.

According to Banter General Manager Yoram Nelken, Rapport can route each question to the appropriate service representative, track each case and issue reports on a regular basis. The Israeli start-up, with U.S. headquarters in San Francisco, aims to compete in the area of automated e-mail response against a growing number of vendors active in this arena, including Brightware.

Rapport, which works on SQLServer, ships this week and starts at a price of $500,000.

Catalog commerce

In a different e-commerce niche — online catalogs — OneSoft this week will ship the third version of its Windows NT-based OneCommerce, which is used for selling in a business-to-business or business-to-consumer environment.

OneCommerce 3.0's big feature is that it uses XML to manage content, according to product marketing director Aaron Cockerill.

"All our components are in XML for searching, access control and order processing," he says.

With XML tag structures such as Extensible Stylesheets Language, it's easy to make rapid changes to customer-specific pricing or supply agreements in an online catalog. OneCommerce 3.0 supports the Microsoft BizTalk XML Data Reduced Schema for processing business documents using Microsoft's XML-based Common Object Model (COM).

Web site Espanol.com, which sells Spanish-language books and videos, has been an early adopter of the XML-based OneCommerce software. Espanol.com has found XML to be particularly beneficial for sending orders to fulfillment partners.

Kyle McNamara, CEO of Espanol.com, says his Web site transmits book and video orders in XML format directly to its online order-processing service, OrderTrust.

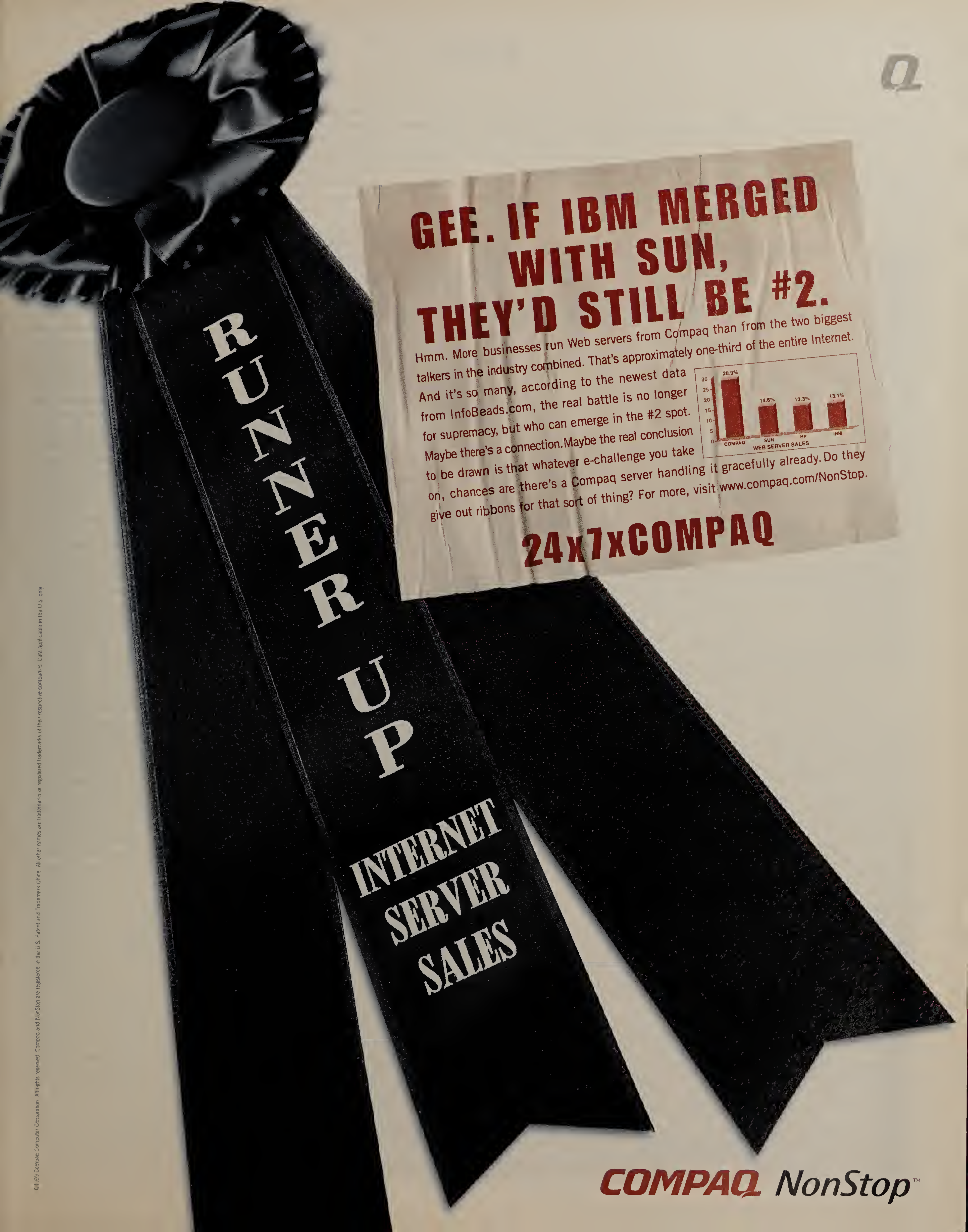
"I'm also able to quickly connect to other fulfillment partners, such as Baker & Taylor, using XML," McNamara says.

OneCommerce 3.0, which costs $600,000, competes against BroadVision's One-to-One product. BroadVision's technology underpinnings, however, are based on The Object Management Group's Common Object Request Broker Architecture (CORBA) rather than Microsoft's COM.

Banter: www.banter.com; OneSoft: www.onesoft.com

Be a
Net Know-It-All
For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2467 in the DocFinder box.
This week's question:
What was the focus of the FCC's landmark Carterfone Decision in 1968?

E-commerce
Fusion Focus
Subscribe to our free newsletter.
DocFinder: 5434



GEE. IF IBM MERGED WITH SUN, THEY'D STILL BE #2.

Hmm. More businesses run Web servers from Compaq than from the two biggest talkers in the industry combined. That's approximately one-third of the entire Internet. And it's so many, according to the newest data from InfoBeads.com, the real battle is no longer for supremacy, but who can emerge in the #2 spot. Maybe there's a connection. Maybe the real conclusion to be drawn is that whatever e-challenge you take on, chances are there's a Compaq server handling it gracefully already. Do they give out ribbons for that sort of thing? For more, visit www.compaq.com/NonStop.

24x7xCOMPAQ

COMPAQ NonStop™

©1999 Compaq Computer Corporation. All rights reserved. Compaq and NonStop are registered in the U.S. Patent and Trademark Office. All other names are trademarks or registered trademarks of their respective companies. Data applicable in the U.S. only.

BadgerNet,
continued from page 1

they would pay carriers for comparable connections.

Surprisingly, though, voice has been left out of this massive network undertaking. The reason: AT&T is shouldering that load on a virtual voice network and charging a mere 1.8 cents per minute.

"That low a rate means any form of convergence just isn't worth considering," says Loren Lamphear, BadgerNet project manager in the Bureau of Telecommunications Management.

Virtually all other state traffic, however, now rides BadgerNet in one form or another.

BadgerNet grew out of a 10-year-old AT&T network used to connect remote agency offices to mainframes in Madison, the state capital. As these networks became routed and bandwidth needs increased, the state started looking for a more flexible alternative.

In 1994, the state put out a bid to provide frame relay access to a backbone of 30 T-1s: Ameritech eventually won the bid. The frame relay traffic had to be handed off to AT&T for long-haul runs because regulations prohibit Ameritech from providing inter-LATA service.

But it wasn't long before the state became convinced it could install a private backbone that would handle long-distance traffic for less than AT&T was charging. The state also wanted to build in some redundancy, so it issued a request for proposal for a redundant 155M bit/sec OC-3 backbone, preferably SONET-based.

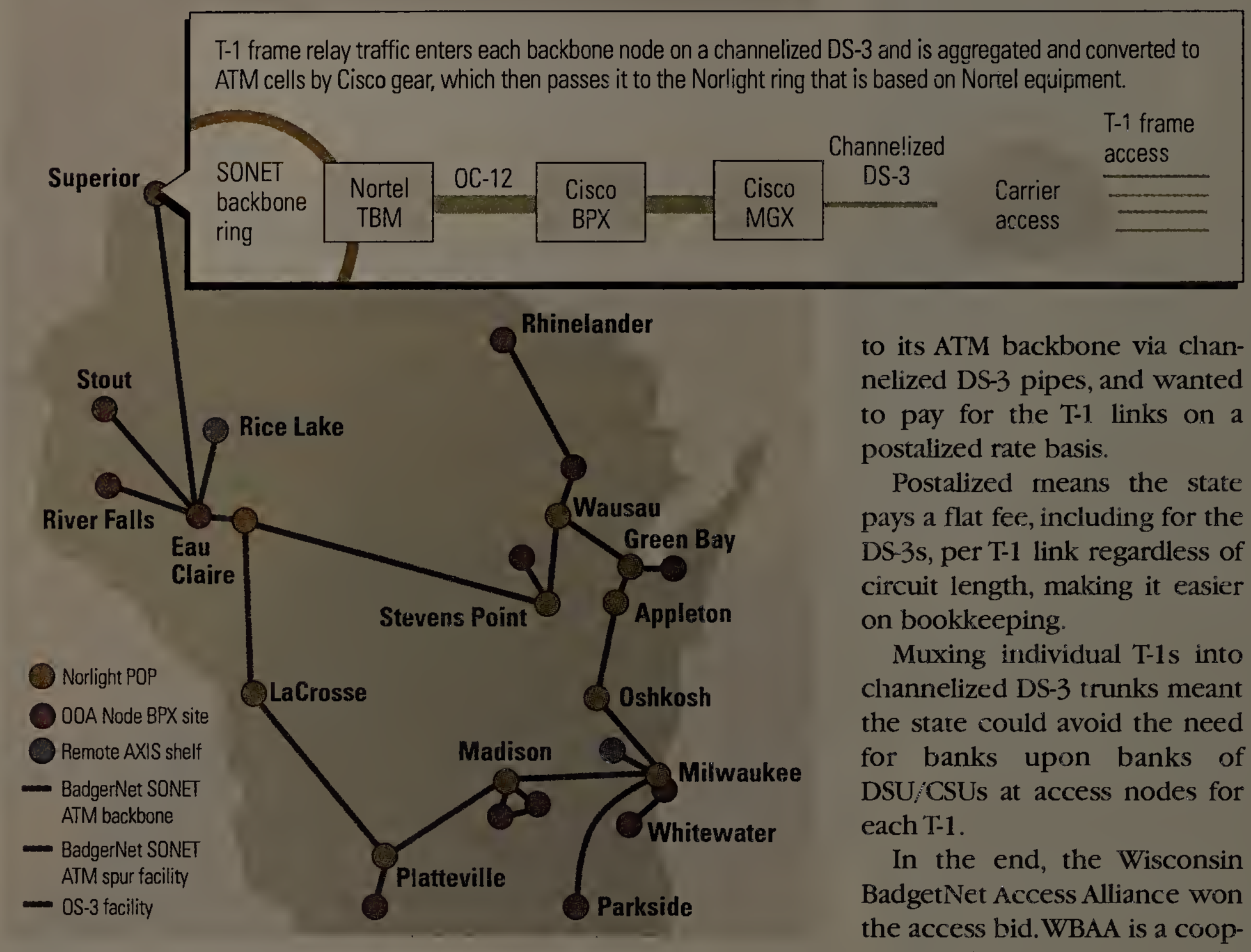
AT&T, Ameritech and newcomer Norlight bid on the project. Norlight, an amalgam of electric companies that was constructing an OC-48 SONET ring on power pole rights-of-way throughout the state, ultimately won the project by promising to deliver the OC-3 backbone for $29,000 per month. Although the state only contracted for the OC-3, Norlight put aside an entire 622M bit/sec OC-12 for state use.

In July 1996, while the bid was still out, the state realized it needed a full-time coordinator for the project and hired Lamphear, who in turn brought in Marcy Egges, an ATM expert; Christopher Alberts, a network designer for Ameritech; and other staff as the project evolved.

Today BadgerNet links all parts of the state to Madison via the Nortel-based SONET ring fed by Cisco ATM switches.

BadgerNet spans Wisconsin

The state of Wisconsin opted to maintain the frame relay access that state agencies were accustomed to when it migrated to a private ATM-over-SONET backbone that provides rock-bottom data transport prices.



T-1 frame relay traffic enters each backbone node on a channelized DS-3 and is aggregated and converted to ATM cells by Cisco gear, which then passes it to the Norlight ring that is based on Nortel equipment.

Access RFP

The new team's first project was to connect state agencies and schools to the brand-new backbone.

Although network designers wanted ATM as the switching technology for the backbone, they rejected the option of running ATM out to remote sites because agencies and schools were already familiar and comfortable with frame technology. Furthermore, the designers didn't want the 15% to 20% ATM overhead to cut into throughput on thinner access links. That overhead could have forced some sites into needing more than a single T-1, Lamphear said.

So the state put out an access RFP telling carriers it wanted T-1 frame access links delivered to its ATM backbone via channelized DS-3 pipes, and wanted to pay for the T-1 links on a postalized rate basis.

Postalized means the state pays a flat fee, including for the DS-3s, per T-1 link regardless of circuit length, making it easier on bookkeeping.

Muxing individual T-1s into channelized DS-3 trunks meant the state could avoid the need for banks upon banks of DSU/CSUs at access nodes for each T-1.

In the end, the Wisconsin BadgetNet Access Alliance won the access bid. WBAA is a cooperative of Ameritech, GTE and a confederation of 54 independent local phone companies. It proposed aggregating all traffic at 30 nodes and offered a postalized rate of $355 per month per T-1.

The $355 represents just the cost for the access facilities, not what the state charges agencies for use of BadgerNet. After rolling up the charges for the use of a router, router management, backbone transport and access, the total bill for T-1 access to BadgerNet is $900 per month.

According to Alberts, a similar carrier connection from, say, Superior to Madison, would cost about $3,000 per month. "We don't care where you're located, it's $900 per month," Lamphear says. "You can't do it for less if you've got an area the size of Wisconsin."

Once the access links started going in, things moved fast, Alberts says. Three state employees and an outside vendor were installing the routers at a frenetic pace, the peak being 40 routers in a week. At the height of the project, BadgerNet filed 91 requests for T-1s in one day. "We stretched the limits of the telcos," Lamphear says.

In the year from October 1998 to October 1999, some 894 T-1s were installed, and the network now boasts a total of 1,385 T-1 access trunks.

These access lines feed into state access nodes. At the nodes, Cisco MGX frame relay concentrators pass the frame traffic into Cisco BPX ATM switches. The BPXs in turn convert the frame to ATM. Nortel S/DMS Transport Node SONET add-drop multiplexers pick up the traffic from the BPXs via OC-12 fiber links and drop it on the SONET ring. At these same nodes, Cisco Lightstream 1010 ATM switches drop traffic from university campuses onto the backbone through the BPXs.

All of the BadgerNet traffic terminates in Madison and is

WISCONSIN'S VIDEO NET RIDES LOW-PRICED DS-3s

As Wisconsin's SONET-backed BadgerNet data network was being designed in 1996, the state legislature mandated a program to provide video and Internet access for local schools, libraries, museums and even zoos.

Called technology for educational achievement (TEACH), the new program required the state to support distance learning and provide broadband Internet access to 377 locations.

Network designers considered adding the traffic to its ATM-over-SONET BadgerNet backbone, but after putting the project up for bid, it proved cheaper to leave the whole thing in the lap of a carrier.

The Wisconsin BadgerNet Access Alliance won the job by proposing a DS-3 network that costs $1,850 per line per month for video, and $640 for data. With subsidies, eligible institutions pay just $250 per month for DS-3 video access, and that includes T-1 Internet access to boot. Locations that just want the Internet access pay only $100 per month.

Each state facility with DS-3 access has a Tektronix video codec that supports four 9M bit/sec video channels, three incoming and one outgoing. It also supports a T-1 link between an on-site router and the Internet. The video and Internet traffic is sent over the DS-3 link to a carrier switching office, where the T-1s are stripped off and connected to the Internet.

The video traffic goes through a video switch and is trunked point-to-point to other switching offices on up to eight DS-3s, depending on how much traffic goes between any two offices.

Those inter-office links are provided by the carrier because it is cheaper than if the state provided them over the SONET backbone.

— *Tim Greene*

distributed throughout the city to state agency buildings via the Madison metropolitan area network, or MADMAN. MADMAN is anchored by four Cisco Lightstream 1010 ATM switches and many of the intracity links are on state-owned fiber.

With all of that bandwidth in the backbone, one would think voice would have fit rather neatly into the BadgerNet picture, and at one point the idea was entertained.

The state issued an RFP for long-distance voice, and said bidders could propose solutions that included BadgerNet.

AT&T won with a Software Defined Network that costs the state 1.8 cents per minute for on-net calls. For off-net in-state calls, the rate is 5 cents per minute, and 6 cents per minute for interstate calls. Calls to 800 numbers cost 5.5 cents per minute.

Lamphear expects that long-distance carriers will continue reducing rates in order to keep large customers from migrating voice traffic to data networks. The incremental cost of adding traffic to an established long-haul voice network is low, he says. "They'll keep ratcheting down the prices."

Lessons learned

While the network is now up and running, the BadgerNet team still has work to do. For one, it needs a database to track what sites have what gear in what configurations. "Management is a huge issue at this point," says Egges, the ATM expert.

A billing system is in the works to track what each agency owes to the state, and what the state owes to individual vendors that provide pieces of the net, she says. And the administration team needs a system for verifying that each vendor lives up to its contracts.

"Nobody likes administration and billing, but it's a huge component of being cost-effective," Egges says.

Management tools are also somewhat lacking, Egges says. "It's not as proactive as we would like it to be. Now, we find out about trouble when an agency calls and says a router isn't working."

Ideally, planners should build their business processes first and have them in place as the network is turned on, Egges says. "We were unaware that administration of the network would be as people-intensive and time-consuming as it turned out to be."

Looking toward the future, the BadgerNet team expects to embrace digital subscriber line (DSL) technology as access bandwidth needs continue to grow (DSL offers higher-than-T-1 speeds for less than the cost of multiple T-1s or fractional T-3s), and ultimately may look at some optical switching technology when it becomes available.

Asked if some day it wouldn't be easier to swap out all the BadgerNet components and simply tie remote locations to Madison over a big Internet-based virtual cloud, Egges and Alberts were emphatic about how far away that future lies.

"Quality of service is still not there," says Egges, an ex-Bell Labs researcher who still does a lot of work on QoS. "There are so many pieces needed that are just not there yet. I'm not saying it can't be done, but at this point it takes a lot of engineering resources to make it work."

"Show me that it can work and that it will be cost-effective, and then I'll consider it," Alberts says.

For now, the state is content to sit back and reap the savings from this gargantuan net project. ◪

Get more information online. DocFinder: 5731
www.nwfusion.com

100 MBPS. 10 MILES. 0 WIRES.

10 Mile Distance – We've Got You Connected
100 Mbps IP wireless connectivity for point-to-point, star, tree, or mesh metropolitan networks.

100X Faster Than Other Wireless Systems
Robust wireless networks without inter-building bottlenecks.

No Monthly Fees, No Strings Attached
WinNet's WIN-100 wireless Fast Ethernet systems – Wire-speed throughput without a monthly financial penalty.

5,000 Miles Sweepstakes

Act fast for a chance to win 5,000 frequent flyer miles.

Register at:
www.winnetmcs.com

WinNet
635 Vaqueros [illegible]
Sunnyvale, [illegible]
T: (408) 527-8700 F: (408) 522-8706

dreams made real.

©Agilent Technologies, Inc. 1999

Considering the pace of technology, it wouldn't hurt to change a few things. These days the faster you are on your feet, the better. The same thing goes for your business partners. That's why four of HP's most innovative business groups have become a brand new company. Introducing Agilent Technologies. You'll find the same people and the same passion. So no matter what comes next, or how fast it arrives, you're ready to roll.

Agilent Technologies
Innovating the HP Way

Agilent Technologies is a subsidiary of Hewlett-Packard Company. www.agilent.com

With Colorstamps.com, it pays to click

BY APRIL JACOBS

FRAMINGHAM, MASS. — It can pay to click, at least if the site you're visiting is Colorstamps.com, a newly launched search engine and e-commerce portal that pays people to go to its advertisers' Web sites.

No, the rewards aren't big for each individual visit — in fact they amount to pennies. But for the avid surfer, a little change is better than none at all. That's Colorstamps founder and CEO Victor Shi's theory anyway. The site debuted earlier this month with the help of $2.5 million in technology venture capital from Hewlett-Packard. Colorstamps also has financing from Japan's Nikko Capital.

Colorstamps is using HP 9000 Series Web servers to host its site, which had about 1.5 million hits during its first week of business. Shi says HP was able to set up the infrastructure in 45 days.

With more than 650 advertisers signed up already, Shi says he thinks the company is off to a good start — and he extends a lot of credit to the creative payback system. "We didn't want to be like every other start-up out there," Shi says. "All we're doing is paying people to do what they would normally do anyway."

Users are told how much cash they will get for going to a site, which they can pick from a range of categories. An on-screen display tracks the amount of cash a user earns after they register with Colorstamps, and checks are sent out monthly.

Shi says advertisers like paying for advertising based on how many people visit them. By paying more for each user click, the advertiser gets more prominence on the Web site. ◪

T-1s,

continued from page 1

only to frame relay customers, though part of the T-1 bandwidth can be used for other services. The base price is available for a one-year contract and goes down to $228 for a five-year T-1 commitment (see graphic).

Sprint's program is officially labeled a "Flat Rate Access Promotion" but actually involves four separate rates. T-1 access is priced at $200, $300, $400 or $500 per month depending on geographic factors. The 64K bit/sec rates are similarly banded, with the lowest available rate set at $100 per month, mostly for highly concentrated urban locations.

Sprint's promotion expires Dec. 31, but officials say it's likely to be renewed because of competitive pressures. And Sprint's program has one key advantage over MCI's — it's available for basically all uses, including frame relay, dedicated IP services and voice services.

Still, analysts point to MCI's $285-per-month offer as a sign that the T-1 market is finally bending to the bandwidth efficiencies that carriers have touted for years on their network expansions but often failed to reflect in their user prices. As recently as early this year, typical T-1 local access lines were going for $500 per month — and well over $750 per month in sparsely populated regions.

"Whether it's the middle of Manhattan or the middle of Montana, that's an extremely attractive number, and you don't have to mix and match the rates," says Steve Taylor, president of Distributed Networking Associates in Greensboro, N.C.

Flat-rate T-1 pricing is not new. Long-distance carriers last year began offering custom contracts with flat rates for T-1s. But those deals were not part of general offers and tended to be available only to the largest enterprises. The new offers are filed as tariff promotions with the Federal Communications Commission and thus must be offered to any user.

Technically, carrier representatives are not obligated to tell users about the promotions and could still charge T-1 list prices running $500 or more. "But very few frame relay customers are not in a position to negotiate, so the first thing we tend to do is apply the promotion," says Peggy Arnone, a data-products group manager at Sprint.

Salespeople have often stumbled over access prices, and the carrier that arms its sales staff with a simpler, less expensive schedule can often win the bid. "That way you don't have to have rocket-science analysis to figure out the cost of the network," Taylor says.

One reason why the large carriers can now simplify their access prices is that they have dramatically increased the number of frame relay switches in their networks, he adds. "If you have 500 POPs instead of five POPs, the odds of having a very long local loop goes way down because the backhaul goes way down," Taylor says.

Flattening out those T-1s

Nationwide monthly flat rates for 56/64K bit/sec and T-1 access to MCI WorldCom's frame relay service:

Term of contract	56/64K bit/sec rate	T-1 rate
One year	$150	$285
Two years	$142.50	$270
Three years	$138	$240
Four years	$135	$234
Five years	$127.50	$228

Rates apply for dedicated-access lines over local telephone company facilities. Lower rates are available where MCI WorldCom has its own local networks. Orders must be placed by Dec. 31, 1999 and lines must be installed by Jan. 31, 2000.

In the past, carriers have often engaged in the fiction of local "virtual POPs" — locations without a frame relay switch designated to keep the official mileage calculation to a customer site small — but they kept the per-mile price artificially high to hide the backhaul expense.

Another change is MCI WorldCom now owns some local networks, reducing its own access costs. MCI charges an even lower T-1 flat rate if a user can put all of its facilities on MCI local fiber: $142.50 per month, per site on a one-year contract.

In some pockets of the country, there is also price pressure where local carriers offer DSL access to frame relay. For example, US West's Interprise division offers an ISDN-like DSL access link — called 2-wire 128K bit/sec Frame Relay — with the access link costing about $40 per month.

Because the MCI and Sprint promotions do not have intermediate offers between DS-0 and DS-1, customers might want to consider such DSL access for sites needing more than a plain vanilla 56K bit/sec frame relay connection, Taylor says. But for large national bids, the national promotions mean less hassle and are more certain to be available, he says.

MCI WorldCom officials acknowledge that their promotion is part of a package of concessions to customers as amends for its 10-day frame relay bobble in August. The package also includes discounts on backup frame relay facilities and a set of automated customer-notification procedures in case of new outages. AT&T still does not have a generally available flat-rate access promotion, though it offers flat rates on a case-by-case basis, according to sources. Qwest does not have flat-rate access deals but will develop one after it completes its acquisition of US West, a spokesman says.

The MCI WorldCom and Sprint access promotions were filed with the FCC prior to the two companies' recent merger announcement. Data product managers of both companies said they couldn't comment on the prospect of combining their networks and promotional offers if the merger deal goes through. ◪

Get more info online.
DocFinder: 5732
www.nwfusion.com

Frame Relay
Fusion Focus
Subscribe to our free newsletter.
DocFinder: 5434

NetworkWorld

Editorial Director: John Gallant
Editor in Chief: John Dix

NEWS
Executive Editor, News: Doug Barney
News Editor: Bob Brown
Associate News Editor: Michael Cooney, (508) 875-6400
Associate News Editor: Paul McNamara, (508) 820-7471

NETWORK WORLD FUSION
Online Editor: Adam Gaffin, (508) 820-7433
Managing Editor: Sandra Gittlan, (508) 820-7431
Staff Writer: Jason Meserve, (508) 820-7567
Online Copy Editor: Sheryl Hodge (508) 820-7532

INFRASTRUCTURE
Senior Editor: John Fontana, (303) 377-9057, Fax: (303) 377-9059
Senior Editor: John Cox, (978) 834-0554, Fax: (978) 834-0558
Senior Editor: Jeff Caruso, (650) 358-4515, Fax (650) 358-4518
Senior Editor: Deni Connor, (512) 345-3850, Fax: (512) 345-3860
Senior Editor: Jim Duffy, (508) 820-7525
Senior Writer: Marc Songini, (508) 820-7484
Senior Writer: April Jacobs, (603) 742-1789

CARRIERS & ISPs
Senior Editor: David Rohde (202) 879-6756; Fax: (202) 347-2365
Senior Editor: Tim Greene, (508) 820-7422
Senior Editor: Denise Pappalardo (202) 879-6745; Fax: (202) 347-2365

ENTERPRISE APPLICATIONS
Senior Editor: Ellen Messmer, (202) 879-6752, Fax: (202) 347-2365
Senior Editor: Carolyn Duffy Marsan, (703) 917-8621; Fax: (703) 917-8622

COPY DESK/LAYOUT
Managing Editor: Charley Spaktor
Copy Chief: Melissa Shaw
Senior Copy Editors: Lisa Kaplan Adase, Denise Dubie
Copy Editors: John Dooley, Ian Lamont
News Layout Editor: Lisa Kaplan Adase

ART
Design Director: Rob Stave
Associate Art Director: Tom Norton
Deputy Art Director: Allyson Nickowitz
Assistant Art Director: Paul M. Lee
Graphic Designer: Lisa Hovsepian
Online Designer: John Fischer
Infographics Researcher: Phil Hochmuth

FEATURES
Features Editor: Neal Weinberg, (508) 820-7449
Managing Editor, Features: Amy Schurr, (508) 820-7485
Features Writer: Sharon Gaudin (508) 820-7419
Associate Features Editor: Susan Collins, (508) 820-7413
Associate Features Editor: Suzanne Gaspar, (508) 820-7489

REVIEWS
Technology Editor: Lee Schlesinger (508) 820-7416
Test Alliance Director: Christine Burns (508) 820-7456
Test Alliance Partners: Mark Gibbs, Gibbs & Co.; Joel Snyder, Opus One; Dennis Williams, ProductReviews.com; John Bass, Centennial Networking Labs; Bob Currier, Duke University; Gail James, LANQuest Labs; Tere' Bracco, Current Analysis
Contributing Editors: Daniel Briere, Mark Gibbs, James Kobielus, Mark Miller

SIGNATURE SERIES
Executive Editor: Beth Schultz, (773) 283-0213, Fax: (773) 283-0214
Senior Editor: Julie Bort (970) 468-2864, Fax: (970) 468-2348
Art Director: Tom Norton
Deputy Art Director: Allyson Nickowitz
Senior Copy Editor: Danisa Dubie

Editorial Operations Manager: Cheryl Crivello
Office Manager, Editorial: Glenna Fasold
Editorial Assistant: Pat Josefek
Research Assistant: Deidre Massenburg

ANDERSON & LEMBKE AMSTERDAM

It was the only way we could photograph our latest router.

Just how fast is Ericsson's new Internet backbone router? 40 million packets per second fast. Great, but you also need reliability.

Well, for decades now Ericsson has been building business-critical networks. Experience, in the shape of the AXI 520, we're now bringing to datacom.

So not only do you get superior packet performance and low latency, but it's also highly flexible and scalable. The footprint is very small and port density is exceptional. Highly maintainable modular software improves reliability and cost of entry is low.

Just the kind of class-leading performance you need – whether you're turbocharging your existing network to meet the demands of new applications, such as voice over IP, or preparing for the mobile data explosion.

Which is exactly why major ISPs and carriers can rely on the AXI 520 for the most demanding backbone applications.

AMERICA'S CUP
2000 NEW ZEALAND
Official Sponsor

ERICSSON

INTRODUCING SOMETHING ALL TOGETHER DIFFERENT
FROM UNISPHERE SOLUTIONS.

www.unisphere.cc

©1999 Unisphere Solutions. All rights reserved.

SERVICE READY NETWORKING.™

Ever hear anyone call you an "infrastructure provider"? Of course not, you're a service provider. Why then are you still ruled by bandwidth and protocols just when your customers are most in need of new services?

Clearly it's time for something all together different – Service Ready Networking from Unisphere Solutions. It's a services-enabled architecture ready from Day One to respond quickly to customer demands for next-generation converged solutions. So service providers like you can reap the benefits of rapid time to revenue. Stand out in today's winner-take-all marketplace. And cut yourself a larger slice of market share, right now.

Service Ready Networking is unique from the ground up. For openers, its technology framework allows you to create and deploy converged voice/data services across any infrastructure. So you can forget the restrictions of hardware-driven networks. And concentrate instead on satisfying customer demands with the broadest mix of value-added services.

Of course, that's not the only freedom you'll enjoy. By separating service creation and assurance from hardware-based service delivery, Service Ready Networking ensures vendor independence. Which saves time and cuts cost when bringing new services to market. Need another competitive edge? Service Ready Networking offers flexible subscriber service management for on-demand services. Policy driven and open standards-based, this platform means faster service deployment and maintenance. Not a bad idea when it comes to winning new customers or retaining old ones.

All this sound too good to be true? Then consider this. Unisphere Solutions is an innovative start-up from the world's leading telecommunications company, Siemens. Which means we have the know-how to make Service Ready Networking a working reality for you.

So why remain blinded by infrastructure when the real answer is already within sight? Service Ready Networking from Unisphere Solutions.

ALL TOGETHER DIFFERENT.™

Unisphere
SOLUTIONS™
A Siemens Company

DOES ALL THE HYPE ABOUT INTERNET VPNs LEAVE YOU LOOKING FOR OTHER WAYS TO COMMUNICATE?

These days, much of the talk surrounding Internet VPNs isn't much more than smoke. That's why hundreds of leading businesses are turning to UUNET® when they need reliable global VPN services that are a reality today. After all, UUsecure℠ VPN is a managed end-to-end VPN that's unmatched in the industry. As part of the MCI WorldCom℠ global fiber network, we can carry your critical data from local-to-global-to-local seamlessly. With UUNET, you don't just get access to the world's most rigorously engineered Internet network. You also get security features of a private network, at a fraction of the cost. So if you're tired of high-flyers with empty promises, call 1 800 258 9688 or visit www.info.uu.net/vpn. You'll quickly discover that only UUNET dares to guarantee network availability, performance and latency.* And that's no stunt.

UUNET
An MCI WorldCom Company

THE WORLD'S INTERNET COMMUNICATIONS COMPANY

[illegible]

Infrastructure

TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage

Briefs

Desktop video vendor **VCON** last week announced that it has added support for the Differentiated Services (Diff-Serv) specification to its MeetingPoint 4.0 software. MeetingPoint aggregates multiple videoconferencing sessions into a single call. Diff-Serv assigns quality-of-service classifications to various applications based on service-level agreements. Diff-Serv adds to VCON's PacketAssist architecture for managing video bandwidth usage over an IP net.

The Diff-Serv upgrade is free. VCON: www.vcon.com

Vixel has unveiled two Fibre Channel switches for storage-area network (SAN) customers. The 7100 and 7200 switches are eight- and 16-port switches that can be upgraded to full-fabric devices as storage needs grow. The boxes work in conjunction with networks based on Windows NT, Linux or Solaris, and are rack-mountable.

The switches will be available in January starting at $7,000 for the 7100; the 7200 costs $12,000. Vixel: www.vixel.com

PC maker **Acer** last week bought **Pivotal Networking,** a supplier of access router products. Details of the deal weren't released, but Acer says it will use Pivotal technology to boost Acer's voice-over-IP offerings.

In related news, Acer says next year it expects to triple its production of Internet access appliances to about three million units. Acer this year will ship about one million non-PC 'Net devices. At Comdex, the firm unveiled several new 'Net appliances, ranging from the I-Station, an MSN-based Web Companion device, to set-top boxes and a screen phone that give users one-button access to e-mail and the Web.

Vendor certification: Does anyone care?

BY DENI CONNOR

Companies may have to spend money they consider a waste and suffer lost worker time to recertify their network staffs as a result of changes Novell and Microsoft have recently made to their certification programs.

Novell announced that all Certified Novell Engineers (CNE) will lose their certification unless they become trained on NetWare 5 by the end of August 2000. Microsoft will revoke the certification of its Certified Systems Engineers (MCSE) in December 2001 unless they recertify on Windows 2000.

The issue may prove particularly nettlesome in shops that have no foreseeable plans to move to Windows 2000 or NetWare 5. "Why should their staffs need Windows 2000 certification to maintain their MCSE?" asks Dave Kinnaman, a network consultant in Seattle who also writes MCSE study guides. The same is true for NetWare, he says. At present, 90% of Novell's installations are NetWare 3 or 4, and Win 2000 won't ship until February of next year.

"Saying MCSEs are no longer qualified for their work is a foolish marketing-based exaggeration," Kinnaman says. "They are still quite qualified for the Windows NT 4.0 work in their companies."

The cost of obtaining a MCSE is steep, running from $5,000 to $10,000 for six to seven weeks of classes. If a person elects to become certified through self-study, the investment can be as little as $1,000. For a company that offers tuition reimbursement, the cost of recertification can be as much as $2,000 per network professional.

While the certification changes are causing a fuss in some circles, other network managers see the changes — and the programs themselves — as much ado about nothing. Some net professionals say that while continuing education is important, it's not mandatory for them to have or to keep their current jobs, although they aren't anxious to let their certifications lapse. Their bosses apparently agree, saying they'd rather hire staff with documented work experience as opposed to certification, and they will provide training in specialized areas such as Cisco routers, Linux or security.

"It's just a bunch of letters," says Mark Labow, a network engineer at Skadden Arps, a large law firm in New York. Labow is Microsoft-, Novell- and Cisco-certified.

"When you interview a person, just because he has a certificate doesn't mean he knows anything. It means he has certain basic knowledge, but after a point, you need to be sure he can apply it," says Clarence Ng, network manager at the firm.

"Certification is an added plus, but we are more concerned with hands-on experience that can be proven through work history," says Chuck Yoke, manager of technology architecture for Janus, a Denver-based mutual fund company.

IS managers also say that hiring network professionals has changed in the past few years. Now CNE and MCSE certifications don't have the cachet they once had because almost everyone is getting them. Novell, for instance, has 168,000 CNEs and Master CNEs. A glut of

See **Certification**, page 22

The certification game

There are so many certifications available, observers say it's just a letters game. Here is a sampling:

Novell: Certified Novell Engineer (CNE), Certified Directory Engineer (CDE), Master CNE, Certified Novell Administrator (CNA)

Microsoft: Certified Systems Engineer (MCSE), Certified Professional (MCP), Certified Database Engineer (MCDE)

Cisco: Certified Network Associate (CCNA), Certified Network Professional (CCNP), Certified Internet Engineer (CCIE)

Compaq: Authorized Systems Engineer (CASE)

3Com: Master of Network Science, NetPrep

Cabletron: Cabletron Specialist

ICCP: Certified Computing Professional (CCP), Associate Computing Professional (ACP)

CompTIA: Network+, Certified Network Professional (CNP)

Citrix: Certified Administrator (CCA)

Sun: Certified Network Administrator (SCNA)

Intel: Certified Integration Specialist (ICIS)

SAIR: Linux Certified Administrator (LCA), Linux Certified Engineer (LCE), Master Linux Certified Engineer (MLCE, by February 2000)

Linux continuing on course to woo enterprise net customers

Expected products, kernel improvements bring more features.

BY JOHN FONTANA

IT executives who have been eyeing Linux as an alternative operating system for enterprise servers are beginning to see more diverse options emerge from the open source arena.

In recent weeks, commercial Linux vendors have unveiled easy-to-install desktop operating systems, rolled out an operating system tuned for server environments and engaged in mergers that should help add muscle to the Linux movement.

Early next year, Version 2.4 of the Linux kernel will be available and is expected to address some key enterprise needs. The kernel will include scalability enhancements to the file system and support for large memory stores and symmetrical multiprocessing, according to Linux creator Linus Torvalds.

The advancements don't meet all enterprise operating system require-

See **Linux**, page 23

Madge token-ring switch embraces IP

Company claims new Layer 3 module for Ringswitch frees up net bandwidth.

BY MARC SONGINI

WEXHAM SPRINGS, U.K. — Madge Networks last week announced a switch module that should make token-ring backbones and LANs more IP friendly.

The company says its Madge. Connect unit's new Ringswitch blade, dubbed the Third Layer Services (TLS) Module, will free up about 10% more token-ring network bandwidth by managing traffic more efficiently.

The blade is essentially a fast router that can read IP packet headers and optimize routes across backbone links and sub-networks. The blade, which can handle up to 100,000 packet/sec, eliminates the need for a separate router to be used in combination with the Ringswitch, says Andy Rawll, a Madge business manager.

Madge is one of the last remaining players in the token-ring market, and the new switch blade is yet another example of the company's efforts to keep the technology current in an increasingly IP-centric network world. While Madge has shifted its overall business focus more into the managed network services area, the company continues to promote token ring through its Madge.Connect unit. In the past 18 months, Madge has bought out one-time competitor Olicom's token-ring business and has rolled out 100M bit/sec backbone and 4/16M bit/sec desktop switches as well.

Madge's TLS module can boost performance by 10% in its token-ring switches, such as the Smart Ringswitch Express.

Industry watcher Stan Schatt says that while the module does not break any major technological ground, it does provide a good option for companies that have big token-ring investments but are migrating to Ethernet and IP. It has taken Madge years to acknowledge that it's an IP/Ethernet world, says Schatt, who is an analyst with Giga Information Group, a Cambridge, Mass. consulting firm.

Madge says its TLS blade can be fitted into switches without requiring a LAN shutdown and will convert up to 16 ports on the switch for IP routing. The blade has no ports itself.

The TLS Module is available now and costs $5,000.

Madge: www.madge.com/connect/products

Certification,
continued from page 21

MCSEs is also occurring, Yoke says.

"Instead of being flooded with paper CNEs, now we have the same thing with paper MCSEs. They go to a boot camp for two weeks, cram and get their MCSE, and they come and sit down and have no idea how to really troubleshoot a file server," he says.

Yoke would rather hire someone with Cisco certification or experience working with Cisco routers.

Cisco certification, according to Mike Prince, chief information officer at Burlington Coat Factory, is very broad-based training that requires knowledge of the multivendor infrastructure. Prince is also looking into Linux certification for his staff.

Steve Lopez, director of systems and technology at the National Board of Medical Examiners, looks for more than practical experience. Certification is a plus, he says, but only as an indication that the person sought and achieved certain knowledge. "Certification is still a factor at review time," Lopez says. ◪

Linux,
continued from page 21

ments, but they provide more fuel for the Linux fire.

"It is still not clear Linux has the necessary features for the enterprise," says Tony Iams, an analyst for D.H. Brown Associates in Port Chester, N.Y. "We need to see how the kernel will advance."

The advancements are needed to break Linux away from the pigeonhole it has assumed in the enterprise — single-function servers for the Web or e-mail — and to answer questions about high performance.

But the commercial Linux community is not waiting for the 2.4 kernel.

"There was a certain amount of validation for Linux given the presence Linux had at Comdex," says Ransom Love, president and CEO of Caldera Systems. "It means the business community is looking at Linux as a serious alternative."

Caldera is trying to build on that with its OpenLinux eServer 2.3, a thin server that can be managed remotely. The idea is to manage groups of eServers, instead of individual devices, from a browser-based tool called Webmin.

Caldera plans to add hooks for such enterprise requirements as directory services, so eServers can be incorporated into e-commerce environments.

"We [the Linux community] have to start adding features to Linux that address the needs of . . . the enterprise," says Donald Barnes, director of technical projects for Red Hat.

On the mergers and acquisitions front, Red Hat recently bought development tools company Cygnus Solutions for $674 million in an effort to offer a broader set of products and support to enterprise customers.

Corel is also pumping up its Linux efforts with improvements to its desktop Corel Linux operating system. The company has greatly simplified the install process and put "fit and finish" to the operating system.

Early next year, Corel will ship its WordPerfect Office suite for Linux in an effort to fill the application gap on the platform.

"The biggest glaring hole for Linux is enterprise and desktop applications," says Dan Kusnetzky, an analyst with International Data Corp., a research firm in Framingham, Mass. "For Linux applications it has been 'roll your own' — that's good for developers but not good for the enterprise." ◪

Linux advancements

A number of significant developments in the Linux market over the past weeks are helping make open source software more enticing to the enterprise. Here is a look at just a few of the developments:

Vendor	Product	Importance	Available
Corel	Linux OS	GUI desktop OS, wizardbased install, file manager, update engine	Free version available now; Standard, Deluxe versions ship Nov. 30
Caldera	OpenLinux eServer 2.3	Thin server, component-based Linux OS	December
Linux open source community	Linux 2.4 kernel	The next version of kernel will focus on file system, SMP	Early next year
Red Hat	Development tools from Cygnus merger	Red Hat and Cygnus form the largest commercial open source firm; will focus on enterprise servers, the 'Net and embedded platforms	Merger underway

www.nwfusion.com

LEANING
TOWARD LINUX

Download: Test drive Corel's Linux OS offering.

Discuss: Join a Linux newsgroup to talk about your operating systems concerns.

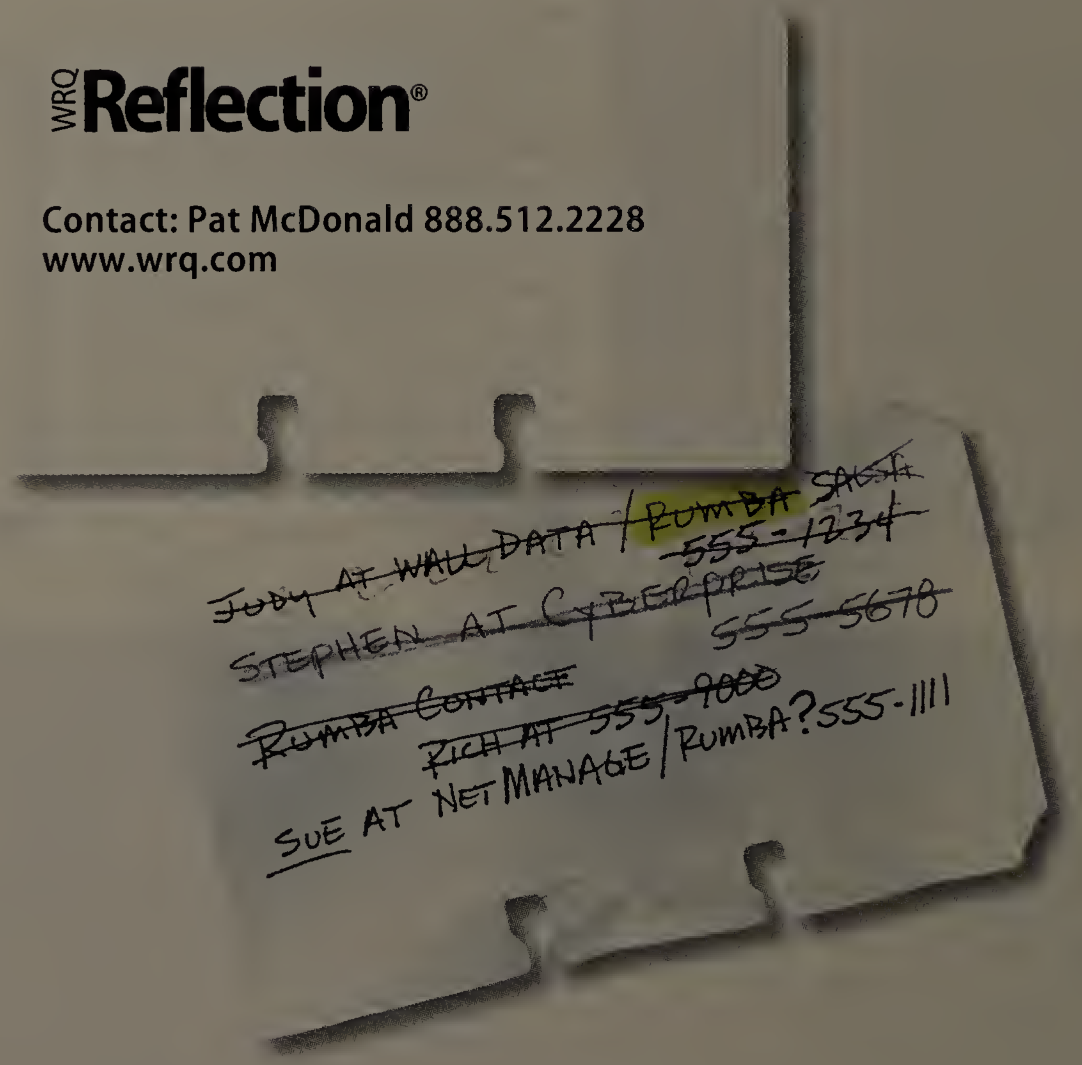
DocFinder 5726 find it online

What element do they all have in common?

Whether customers or partners, there's one element they all share. Inktomi's Traffic Server, the Internet's leading network caching platform from the Internet's leading infrastructure company. What we've done for them, we can do for you. See for yourself. www.inktomi.com

Inktomi®
Scaling the Internet™

RUMBA users:
make this switch your last.


WRQ Reflection®
Contact: Pat McDonald 888.512.2228
www.wrq.com
~~JUDY AT WALL DATA~~ / ~~RUMBA SALES~~
~~555-1234~~
~~STEPHEN AT CYBERPRISE~~
~~555-5678~~
~~RUMBA CONTACT~~
~~RICH AT 555-9000~~
SUE AT NET MANAGE / RUMBA? 555-1111

Why mess around? Right now there's a no-obligation, incredibly easy way to get WRQ Reflection® software—for free!

Introducing the Open Door Program–a special program for current RUMBA® and Cyberprise™ users that gives you the matching number of seats of our award-winning Reflection products–and unparalleled support–for free! There's zero risk. No strings attached. So if you're feeling shaky about your new host access partner, Open Door is the simple way to protect your existing investment while evaluating your long-term host access strategy. See for yourself why WRQ's proven, 18-year track record of reliable products, consistent support, and long-term vision make us the right partner for you.

Sign up for your free Reflection solution by visiting **www.wrq.com/ads/opendoor/iw**

If you're not a Wall Data customer, call 888.512.2228 and ask about our special competitive trade-in pricing.

Some restrictions apply. See web site for details.

© 1999 WRQ, Inc. All rights reserved. WRQ, the WRQ logo, and Reflection are trademarks of WRQ, Inc., registered in the USA and other countries. Rumba and Cyberprise are trademarks of Wall Data, Inc.

www.WRQ®.com

Internetworking Monitor

Kevin Tolly

THERE'S SOMETHING ABOUT CISCO

State what you think is a simple truth about Cisco and readers respond by branding you a minion of Cisco. That is what happened in response to an off-handed remark I made some weeks back in a column (*NW,* Oct. 18, page 28). Ironically, when I explained my point to several readers, they wrote back concurring and providing further proof for my statement.

I wrote: "Because Cisco has its own allure and is not governed by the rules that govern other vendors, I'll leave it out of the discussion."

I was chastised for making a "pro-Cisco" comment and "elevating" Cisco to a higher plane of existence. I was just reporting what I thought everyone already knew — when it comes to Cisco, normal rules need not apply.

What I mean is, Cisco's customers often let the company get away with things that other vendors would never get away with. For example, if the Accelar did not perform at wire-speed at Layer 2 and 3, for all ports, with quality of service disabled or enabled — Nortel Networks would have a tough time trying to sell it in the marketplace. Cisco's customers, however, don't seem to mind a bit that the Catalyst cannot perform anywhere *near* wire-speed.

That said, I've given up trying to apply logic to the Cisco customer "buy" — hence my use of the term "allure." I try to deal with facts, and the fact is that customers and prospects treat Cisco differently than they treat its competitors. Right or wrong, that is what I observe.

I sent this explanation to two correspondents. This excerpt is from a major competitor:

"That is exactly what we experience in the marketplace. Cisco has done a masterful job of marketing themselves by telling customers, 'No one ever got fired for choosing Cisco.' Technically, Cisco doesn't stand up to a lot of other products in the marketplace. Unfortunately, this simply doesn't matter to a lot of customers."

This came from a systems integrator:

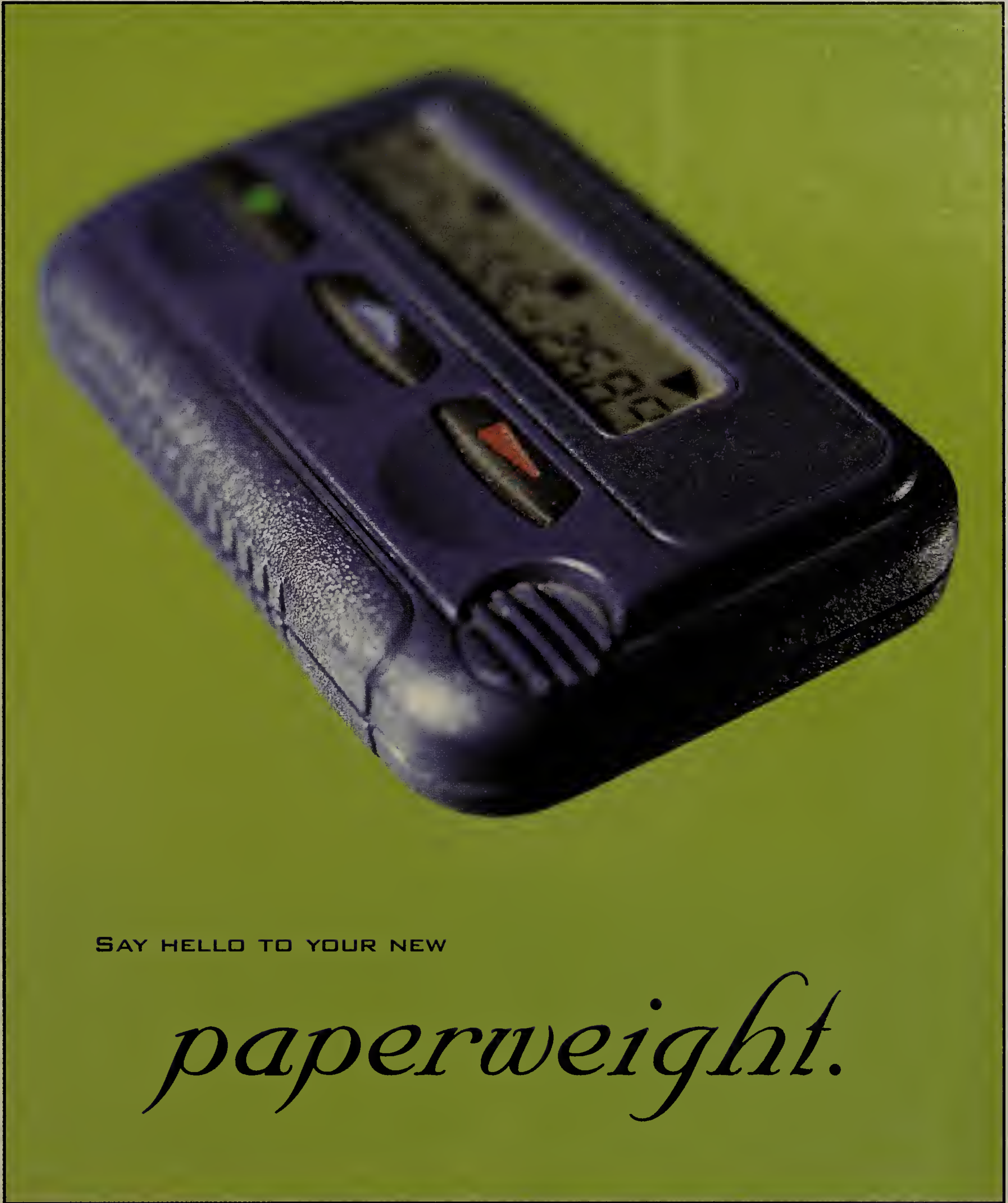
"Six months ago, I did a Bay/Nortel installation with Accelar boxes at the core, and when some equipment did not work as advertised, Nortel was raked across the coals. Last week, I finished an all-Cisco installation where we had serious issues with trunking on 5500 and 6500 series switches and software problems on the 7200VXR routers. The customer didn't mind because they had Cisco. Sad but true."

This is not to say that all Cisco customers are sheep-like. A major office retailer contacted us recently requesting additional information about a Nortel vs. Cisco router test (commissioned by Nortel) that we published a year ago.

The retailer declared itself a happy Cisco customer — contemplating a major migration to Nortel. The reason? The Nortel gear was perfectly matched to its need, and with it, the company calculated WAN link savings that was measured in millions of dollars annually.

Do you agree that "There's something about Cisco"? Let me know.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at ktolly@tolly.com or www.tolly.com.



Test-drive a free evaluation copy of SystemEDGE: www.empire.com/evalad

With critical systems, there's no tolerance for downtime. Which used to mean lots of uptime for your beeper. But SystemEDGE changes all that. It automatically detects failed applications and can take corrective action, without manual intervention. By automating the critical processes that ensure systems stay up, you can do all kinds of proactive management without lifting a finger. Which probably sounds pretty good — especially after all that beeping. SystemEDGE is brought to you by Empire Technologies, a Concord Communications Company. Call 800-851-8725 or visit our Web site today.

CONCORD
The Total View™
www.empire.com

CopperGold | **Solutions**

MC145660

ADSL Multi-Rate
- Single-chip transceiver
- 12 Mbps/1 Mbps on short loops
- Interoperable
- Software upgradable
- Low power

20,000

© Motorola, Inc. 1999. Motorola is a registered trademark and The Heart of Smart, CopperGold, DigitalDNA and the DigitalDNA logo are trademarks of Motorola, Inc.

ft.

Our ADSL Multi-Rate solution brings
more excitement to more people
the more ground it covers.

DigitalDNA™
from Motorola

THE HEART OF SMART.™

And it's outta here...Motorola's new CopperGold Multi-Rate solution pushes reach and throughput to the very limit. Echo cancellation and trellis coding enable performance of up to 12 Mbps on short loops, with service beyond 20,000 feet. It's our smartest modem solution yet, and it's driven by communications processors built on DigitalDNA™ from Motorola. DigitalDNA is chips, systems, software and the ideas of thousands of innovative engineers. Our CopperGold Multi-Rate solution has the flexibility to support both the G.992.1 and G.992.2 standards, and its single-chip integration delivers lower power and greater port density. So come check out our next-generation multi-rate solution. And join the crowd of CopperGold fans. www.motorola.com/coppergold

MOTOROLA EMBEDDED SOLUTIONS

It's not just about an industry-leading IP backbone that's as fast as it is reliable.

It's about giving your subscribers everything except a reason to leave.

ISP success stories start with a network you can count on. With Sprint, you'll get an industry-leading IP backbone with fast transmissions, exceptional survivability and service consistency, and 24/7 customer support. Plus, our unbeatable service level agreements even guarantee 100% site availability.* So, rather than solving problems and scrambling to hold on to your customer base, you can spend more time building it. Isn't that the point of contact?

For more information, call or visit our website
1·877·ISP·5044 sprint.com/isp

Sprint®

The point of contact℠

*100% availability for select configurations. Certain restrictions apply. Contact Sprint representative for details. ©1999 Sprint Communications Company L.P. All rights reserved.

Briefs

Qwest says it's putting its foot down on slamming, after the second regulatory action against the carrier for allegedly switching customers without authorization. The Connecticut attorney general filed suit against Qwest for alleged slamming, in the wake of a recent $2 million fine proposed by the **Federal Communications Commission.** Following the action, Qwest announced a "zero-tolerance policy" backed by periodic third-party verification of sales and annual independent audits of internal reporting processes.

Bell Atlantic Mobile is one of the first wireless service providers trying to ditch the longtime rule that wireless telephone users pay for both incoming and outgoing calls. Bell Atlantic Mobile is testing its Call Me option in Delaware. Call Me will require Bell Atlantic Mobile users to get a new mobile number. The service will eliminate charges from most incoming calls, although users can list up to five phone numbers for which they will still pay for incoming calls.

Bell Atlantic Mobile: www.bam.com

BellSouth is installing gear that can deliver digital subscriber line (DSL) to sites that previously could not be served. Phone lines to those sites tie in to the phone network via remote terminals called digital loop carriers (DLC). Previously, BellSouth lacked gear that could fit in DLCs to support DSL services. DSL lines had to connect directly to phone company switching offices, not remote DLCs. But BellSouth is deploying Wave-Pacer RAM-1100 DSL gear from Pulsecom to extend DSL from the remote terminals.

BellSouth: www.bellsouth.com

Voice over DSL trial passes muster

Medical transcription firm sees technology as way to streamline.

BY TIM GREENE

SYRACUSE, N.Y. — Voice over digital subscriber line may be the prescription Medical Transcription Solutions of New York needs to streamline its telecommunications operation.

After a one-month trial, voice over DSL checks out as a way to reduce the tangle of phone lines coming into the company's headquarters, according to Bill Bigelow, Medical Transcription's vice president.

Because it was a technical trial, whether the service saves money remains unclear.

Rather than lease 42 separate analog phone lines supporting one phone call each, the company could support the 42 voice channels on just six phone lines using voice over DSL. Those same lines could be used simultaneously to carry data. While voice over DSL uses fewer wires for the same number of phones, the costs depend on how much the carrier charges per phone connection.

"I think that could be a very useful application," Bigelow says.

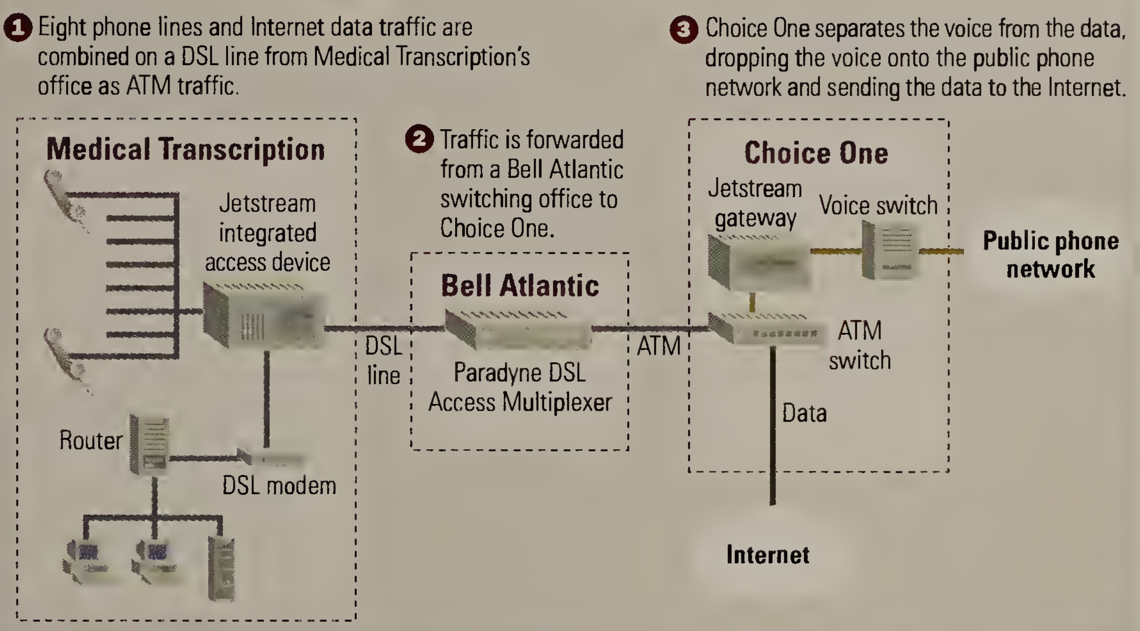
Voice over DSL turns voice into ATM cells at the customer site and sends them over the DSL data stream. At the carrier switching office, the voice is separated from the data and converted back to regular circuit-switched voice. It is then delivered to the public phone network.

In the case of Medical Transcription's service, Choice One Communications delivered the voice over DSL service via a Jetstream integrated access device (IAD) at Medical Transcription's headquarters. The IAD supported eight telephones as well as an Internet connection.

The traffic was combined by the IAD, and fed down the DSL line to a Choice One DSL multiplexer in the local Bell Atlantic switching office. It was then piped back to Choice One's own switching office where the Internet traffic was sent to the Internet and the voice was converted and dropped onto the regular phone network.

The technology is attractive to Bigelow because his business depends on phones

See **Voice over DSL**, page 32


DSL crams more voice on one line

Choice One Communications trialed voice over DSL with Medical Transcription Solutions of New York in Syracuse.

❶ Eight phone lines and Internet data traffic are combined on a DSL line from Medical Transcription's office as ATM traffic.

❷ Traffic is forwarded from a Bell Atlantic switching office to Choice One.

❸ Choice One separates the voice from the data, dropping the voice onto the public phone network and sending the data to the Internet.

Compaq, Cable & Wireless pair to pitch ASP wares

BY DENISE PAPPALARDO

Fueling the partnership trend in the growing application service provider market, Cable & Wireless and Compaq have announced plans to create a global ASP business.

The companies intend to roll out application-hosting services by January to small and midsize organizations.

Cable & Wireless and Compaq did not provide many service details, but company executives did say customers can expect enterprise resource planning (ERP), customer relationship management (CRM), unified messaging, sales force automation and office productivity application-hosting services.

Some of Cable & Wireless' initial application-hosting services will be based on existing relationships that Compaq has with companies such as Microsoft and Oracle. The application-hosting services will include hardware, software, management and implementation for a monthly fee that's based on the number of users accessing the applications.

Cable & Wireless will be deploying Compaq servers within its data centers to support its application-hosting services and will offer customers Compaq client access devices ranging from standard PCs to wireless hand-held devices. Compaq NonStop eBusiness consulting and professional services will also be bundled with the ASP offerings.

The two companies will be investing more than $500 million over the next five years in the new ASP business. Cable & Wireless and Compaq will be sharing revenue stemming for this business.

All vendors involved need partnerships to be successful in the ASP market, says Meredith Whalen, an analyst at

See **ASP**, page 32

Internet Services
Subscribe to our free newsletter. DocFinder: 5434
Fusion Focus www.nwfusion.com

servers

three quarters of all internet servers are intel-driven[1]. why is intel architecture the world's e-business platform of choice? because it's technology people trust. because it continues to strike the right balance between price and performance. because it consistently offers the greatest choice of leading-vendor hardware and software solutions. and because nobody wants to be stuck with a proprietary system five years from now. e-business is growing faster than most e-business budgets. the way to be more effective is to be more cost-effective. and the way to achieve that, long-term, is to deploy your e-business on intel-based servers. this is the surge economy, and it's only the beginning. why intel architecture? → *intel.com/ebusiness*

intel.

[1] Based on 1999 IDC estimates of worldwide Internet server shipments

© 1999 Intel Corporation. Intel is a registered trademark of Intel Corporation

Voice over DSL,

continued from page 29

for voice and data. Doctors dial in to transcription machines to record patient medical records. Transcribers in Syracuse, N.Y., transcribe the recordings to make written medical records.

During the test, Bigelow found no difference between the voice quality on the DSL lines and those on a regular analog phone.

With voice over DSL cutting the number of phone lines into Medical Transcriptions' headquarters, the company could save the recurring monthly cost of $30 per line and also add more lines for less money. Currently it costs $135 to get a new line installed, he says. If a single DSL line can handle eight voice channels, but is not fully loaded yet, more channels can be added via network provisioning without having to string new wires, he says.

Choice One has not set prices on its service, which the company plans to roll out by the end of the first quarter of 2000. Options may include offering less expensive voice channels or offering the voice at a price on par with regular phone lines and tossing in Internet access for free, says Kevin Dickens, Choice One's senior vice president of engineering and operations.

Meanwhile, Bigelow is sold on DSL. He wants to install it in all his transcribers' homes and use a separate voice option — voice over the Internet — to connect them to the main office. Now they have to dial directly and pay toll fees as high as $800 per month. He says voice-over-the-Internet quality will be key to whether the option is viable. Choice One is working out a technical trial of the voice-over-the-'Net option, Bigelow says. ◪

Harder Problems Welcome.

Go ahead. Tell us your problems.
Your hardest problems.
And we'll provide you with the solutions.
Arcstar, NTT Communications'
global solution brand, has the answers to all your
telecommunications problems. WAN, LAN construction.
IP network service.
Network security. And much more.
Arcstar offers one-stop end-to-end
services using the latest technology to provide real
solutions to your real needs.
Why wait any longer?
The solutions are right here.

Better Solutions Found.

A trusted solution service
from NTT Communications

Arcstar

Global Network Services
Global Managed Bandwidth Service / Global Managed Frame Relay Service
Global IP Fax Service / Global EBN Service (IP-VPN Service)
Global High-speed Digital Leased Circuit Service
Global ATM Service / Global IP Backbone Service

Comprehensive One-Stop Services
One-stop Shopping Service
• Applications handled at a single contact point
(International communications lines, local access lines)
One-stop Billing Service
• Multiple bills into a single statement at a single location
• Bills in local currency or any major currency • Split billing upon request
One-stop Maintenance Service
• On site / off site network maintenance • 24 hour global network management
• On-line Help Desk (English / Japanese)
• A full service offering may not be available in some countries

NTT America, Inc. Tel: (212) 661-0810

Your Trusted Partner In Network Solutions

NTT Communications

NTT Communications Group: NTT America, Inc 101 Park Avenue, 41st Floor, New York, NY10178, U.S.A Tel: (212) 661-0810 Fax: (212) 661-1078 NTT do Brasil Telecomunicacoes Ltda. Av. Paulista, 854-11° andar conj. 111 Sao Paulo- SP, Brasil. Tel: 55 (11) 253-0108 Fax 55 (11) 253-0608 / NTT Communications Corporation Tokyo, JAPAN • TOKYO • OSAKA • BANGKOK • BEIJING • HANOI • HONG KONG • JAKARTA • KUALA LUMPUR • MANILA • SEOUL • SHANGHAI • SINGAPORE • SYDNEY • TAIPEI • AMSTERDAM • BRUSSELS • DUSSELDORF • FRANKFURT • GENEVA • LONDON • MADRID • MILAN • PARIS • NEW YORK • MOUNTAIN VIEW • LOS ANGELES • WASHINGTON D.C • RIO DE JANEIRO • SAO PAULO

www.ntt-c.com

www.nwfusion.com

CALLING FOR VOICE OVER DSL

Online education: Mastering voice over DSL.

White paper: The case for voice over DSL.

DocFinder

find it 5725 online

ASP,

continued from page 29

International Data Corp., in Framingham, Mass. Solid ASP services come with application network and systems experts, and most companies don't have all the components, she says.

Cable & Wireless' partnership with Compaq follows on the heels of Sprint's recently announced deal with Deloitte Consulting and Qwest's partnership with KPMG and Hewlett-Packard.

Qwest and KPMG have developed a joint venture called Qwest.CyberSolutions. The ASP hosts all its application servers in Qwest data centers and relies on KPMG's software implementation and management expertise. Sprint's deal with Deloitte is similar, but the two companies are not setting up a specific joint venture to address the market. Instead, Sprint is providing its data centers and Deloitte its software expertise.

Cable & Wireless' deal with Compaq is similar, but Compaq's NonStop eBusiness consulting and professional services business is probably not as well-known among enterprise business users as KPMG and Deloitte. But that may not matter because Cable & Wireless isn't going after the Fortune 1000 with its ASP services.

"These partnerships are only the beginning," Whalen says. Most vendors are struggling to figure out if it would make more sense to sell their software to the ASPs, such as PeopleSoft has done, or to actually become an ASP in the manner of an Oracle. ◪

Go to the Web NOW and get discounts up to 46% on a new APC UPS using Trade-UPS.

Just mail or fax this completed coupon or contact us to learn how you can easily trade in your old APC UPS, or other vendors' UPS, for discounts towards a new APC Smart-UPS®. Better yet, order today at the APC Web site!

Key Code
http://promo.apcc.com p371z

(888) 289-APCC x7729 • FAX: (401) 788-2739

APC
Legendary Reliability™

☐ **YES!** I'd like more information. Please send my FREE information on APC's Trade-UPS program.

☐ **NO,** I'm not interested at this time, but please add me to your mailing list.

APC Smart-UPS® 5000RM

Key Code
p371z

Name: ______
Title: ______ Company: ______
Address: ______
City/Town: ______ State: ______ Zip: ______ Country: ______
Phone: ______
Brand of UPS used? ______ # ______
Brand of PC used? ______ # ______
Brand of Servers used? ______ # ______

©1999 APC. All trademarks are the property of their owners. SU4A9EB-US • E-mail: apcinfo@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 36 WEST KINGSTON RI

POSTAGE WILL BE PAID BY ADDRESSEE
APC
KEY CODE: p371z
Department: B
132 FAIRGROUNDS ROAD
PO BOX 278
WEST KINGSTON RI 02892-9920

How to Contact APC

Call: (888) 289-APCC
use the extension on the reverse side

Fax: (401) 788-2739

Visit: *http://promo.apcc.com*
use the key code on the reverse side

APC
Legendary Reliability™

Your enterprise is only as available as its power

APC Smart-UPS®: Legendary power protection for critical remote servers

Smart-UPS 5000
Rack-mount

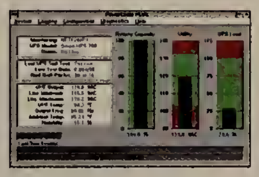
With users and customers demanding that critical servers be up 99.999% of the time, power problems are the last thing you should have to worry about. Short blackouts, sudden sags or simple power surges can mean the instant destruction of cards, disks and processors. This means lost data and unplanned downtime.

Be ready for the unexpected. No other product offers more advanced protection for networks and servers than the APC Smart-UPS family.

Consider how Smart-UPS can safeguard your critical servers:

- **Pre-failure diagnostics –** It allows network administrators to solve problems before users know they exist.
- **Availability –** Instantaneous battery backup power keeps applications and operating systems up and running and safe from power-related crashes.
- **Intelligent Battery Management –** With FastCharge™, battery recharge time is cut by 75%.
- **Web SNMP –** With a Web/SNMP card, Smart-UPS can be monitored and managed remotely with a Web browser or SNMP NMS.

- **Remote –** E-mails or pages network administrators via FlexEvents™ before users know of problems.
- **Manageability –** Provides warnings, environmental monitoring and safe shutdown using PowerChute® *plus* software.



APC's NetShelter® offers manageable enclosure space for all your networking equipment including Compaq, Dell, HP, Cisco, Nortel Networks, 3Com and IBM.

"APC NetShelters and Smart-UPS have become the standard install for all our offices at Nextel... knowing we can count on APC saves us time and provides us with peace of mind."
- James Whitaker, Novell Architecture and Design Engineer,
Tom Schmidt, Novell Host Server Architect,
Troy Sims, Novell Host Server Architect

Find out why APC is the brand of choice for critical server protection. Our technology grows with your business and can help power protect your new applications as you roll them out. Contact APC today and let APC's Legendary Reliability™ work for you.

APC®
Legendary Reliability™

FREE Power Availability Kit. Or save 46% on a new UPS with our Reliability Upgrade Program

Go to the web and learn how to increase uptime in your enterprise. Also trade your old UPS for a new one with APC's Reliability Upgrade Program.

To order: Visit *http://promo.apcc.com* Key Code p371z • Call 888-289-APCC x7729 • Fax 401-788-2797

©1999 American Power Conversion. All Trademarks are the property of their owners. SU4A9EF-US • PowerFax: (800)347-FAXX • E-mail: apcinfo@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA

Eye on the carriers . David Rohde

MCI WORLDCOM, LUCENT KISS AND MAKE UP

It looks like MCI WorldCom doesn't have hard feelings for Lucent after all.

Back in August, MCI WorldCom CEO Bernie Ebbers had petulant words for Lucent after the legacy WorldCom frame relay network — based on Lucent switches — went down for the count.

Ebbers complained that the hardware and software in question was originally Cascade gear and came to Lucent only when Cascade sold out to Ascend and Ascend, in turn, to Lucent. He implied that the trail of acquisitions caused a reduction in qualified Lucent personnel who really knew their stuff, provoking amazement among observers who think that the same can be said about Ebbers' numerous acquisitions.

Yet earlier this month, MCI WorldCom announced that it will build a new parallel frame relay network based not only on Lucent switches but also on a Lucent software load called Jade-M2, a close relative to the Jade-1, or J-1, software load that supposedly failed back in August.

That network will be linked to the company's legacy MCI frame network based on Nortel equipment via a network-to-network interface. It's all part of a multipronged effort to give users new back-up options at discounted rates to stave off another disaster.

For some analysts, these moves confirm long-standing suspicions that there was nothing fundamentally wrong with the Lucent code back in August — and that the network failure resulted from some ill-defined integration issues between the frame relay software and back-office systems. "The problems were not in J-1," leading network analyst Frank Dzubeck flatly states.

MCI WorldCom officials have been softening up Ebbers' accusation, conceding that the new Lucent software release is "essentially the same" as the old one, though with a few "fixes" for whatever went wrong before. And as this column has previously reported, Lucent has been a positive stoic about this because it doesn't want to alienate MCI WorldCom, having bought Ascend largely to penetrate the Nortel- and Cisco-dominated MCI WorldCom and Sprint accounts in the first place.

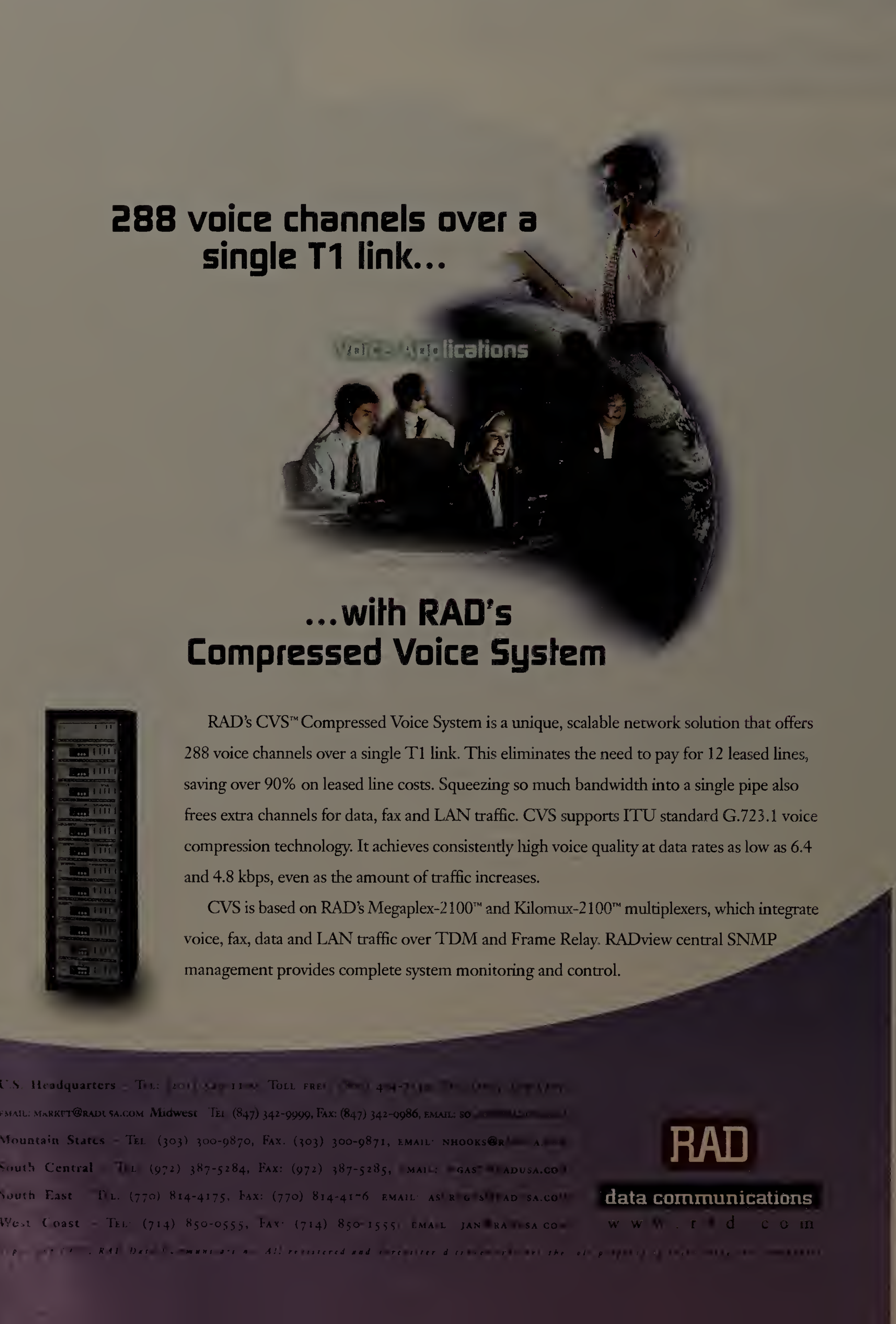
Indeed, now that MCI WorldCom and Sprint are trying to merge, you have to wonder why MCI WorldCom is announcing new back-up networks when Sprint has two frame relay networks of its own. The short answer is that the whole merger thing is happening on a different plane than the actual operations of the two businesses. Mere trivia such as frame relay seems to have been the furthest thing from the minds of Ebbers and Sprint CEO Bill Esrey when they worked their $115 billion deal in an attempt either to (depending on whom you ask):

1) Get MCI the wireless network it doesn't have, and Sprint, the big-city local networks it never built, or;

2) Reduce the long-distance market to a duopoly just as the regional Bell operating companies seem to be reorganizing around SBC and Bell Atlantic.

No matter what any carrier announces now, in the future there will have to be a lot of sorting out of platforms before stability and certainty return to the enterprise data market.

Rohde is a senior editor with Network World. *He can be reached at drohde@nww.com.*



288 voice channels over a single T1 link...

...with RAD's Compressed Voice System

RAD's CVS™ Compressed Voice System is a unique, scalable network solution that offers 288 voice channels over a single T1 link. This eliminates the need to pay for 12 leased lines, saving over 90% on leased line costs. Squeezing so much bandwidth into a single pipe also frees extra channels for data, fax and LAN traffic. CVS supports ITU standard G.723.1 voice compression technology. It achieves consistently high voice quality at data rates as low as 6.4 and 4.8 kbps, even as the amount of traffic increases.

CVS is based on RAD's Megaplex-2100™ and Kilomux-2100™ multiplexers, which integrate voice, fax, data and LAN traffic over TDM and Frame Relay. RADview central SNMP management provides complete system monitoring and control.

U.S. Headquarters - Tel: [illegible] Toll free [illegible] 444-[illegible]
email: market@radusa.com Midwest Tel (847) 342-9999, Fax: (847) 342-0986, email: so[illegible]
Mountain States - Tel (303) 300-9870, Fax. (303) 300-9871, email: nhooks@r[illegible]
South Central - Tel (972) 387-5284, Fax: (972) 387-5285, email: [illegible]adusa.com
South East - Tel. (770) 814-4175, Fax: (770) 814-4176 email: [illegible]sa.com
West Coast - Tel: (714) 850-0555, Fax: (714) 850-1555, email: jan[illegible]sa.com

RAD
data communications
www.rad.com

[illegible] RAD Data Communications [illegible] All registered and unregistered trademarks are the [illegible]

Your enterprise is only as available as its power

APC Symmetra™ Power Array™: N+1 redundancy for 100% uptime

Data access is critical to both your internal and external customers. Now that applications like messaging, Web integration and E-commerce are deemed mission-critical, losing power to your storage and processors is not an option.

You need to be ready for the unexpected. APC's Symmetra Power Array is the single most highly available UPS in the marketplace. Since power problems are the leading cause of downtime, make sure you're prepared.

Consider how Symmetra protects your business:

- **N+ 1 redundancy design assures continuous availability –** If a module fails, the others instantly begin supporting the full load.
- **Scalable power –** Additional 4 kVA modules can be added to expand to 16 kVA of power capacity (4 unit frame is expandable to 8 kVA)
- **Serviceable while load is up and running –** Additional battery modules increase runtime and all the modules are hot swappable, meaning no downtime.

Installing or reconfiguring your modular Power Array couldn't be any simpler.

"Not having a Symmetra in place would have resulted in lost data, corrupted hard drives and lost time to recover. The Symmetra system has more than paid for itself during this one outage."
- Bob Lesher and Charlie Bise, Information Technology, Exel Logistics

Now you can easily manage power to your systems. APC MasterSwitch™ in your communications and computer racks can save you time and money by helping your staff to manage power proactively.

PowerView™ is a hand-held control panel for network administrators that configures and controls UPSs in rack, computer room, and datacenter environments.

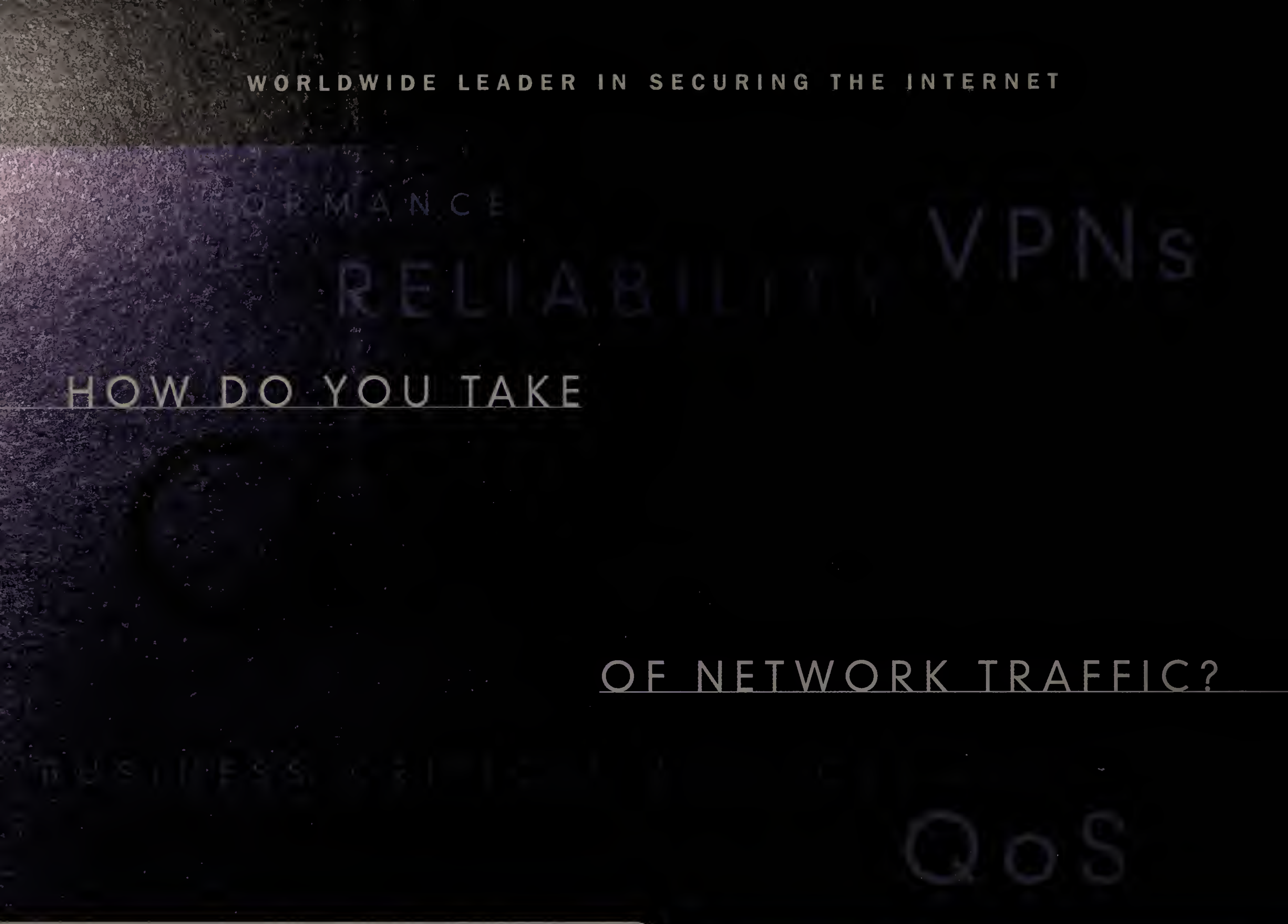
APC is a leader in the field of power availability. Our technology grows with your business and can help power protect your new applications as you roll them out. Contact APC today and let APC's Legendary Reliability™ work for you.

APC®
Legendary Reliability™

FREE Power Availability Kit - Get Legendary Reliability for your network.

To order: Visit *http://promo.apcc.com* Key Code p370z • Call 888-289-APCC x1341 • Fax 401-788-2797

©1999 American Power Conversion. All Trademarks are the property of their owners. SY4A9EF-US • PowerFax: (800)347-FAXX • E-mail: apcinfo@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA



FloodGate-1. The only bandwidth management solution that gives you complete network traffic control.

FloodGate-I™ is an insurance policy for your business-critical network applications. It insures that your Applications and Users get the priority bandwidth they need when they need it — from wherever they are on the network. By giving you control of network traffic by application, service and user, FloodGate-I helps optimize network performance.

FloodGate-I accurately controls the flow of inbound and outbound traffic based on a user-defined, enterprise-wide bandwidth management policy. With an intuitive GUI, FloodGate-I makes it easy to define an enterprise-wide traffic policy based on organizational needs, letting you set weighted priorities, guarantees and limits on network traffic. And you can distribute your network traffic policy to all Internet, intranet and extranet access points from a central console.

Based on Check Point's common architecture for integrated policy management, FloodGate-I can be seamlessly integrated with our market leading enterprise security suite, FireWall-I®, and our VPN-I™ virtual private network solution.

All of our products are backed by an experienced professional services group and 24x7 worldwide customer support.

Find out how to take control of your network traffic. Download a free white paper or evaluation software at: **www.checkpoint.com/floodgate1**

- Network Security
- Traffic Control
- IP Address Management
- OPSEC Alliance
- Integrated Policy Management

CHECK POINT™
Software Technologies Ltd.

We Secure the Internet.

CHECK POINT SOFTWARE TECHNOLOGIES LTD. Check Point, the Check Point logo, OPSEC, FloodGate-1, FireWall-1 and VPN 1 are trademarks or registered trademarks of Check Point Software Technologies Ltd.

Briefs

Start-up **eTime Capital** has begun offering a Web-based service for managing accounts receivable information between buyers, sellers and shippers. The alternative would be installing supply-chain management software on your own intranet and managing trading partner access.

Rohan Champion, chairman and CEO of the Sunnyvale-Calif.-based firm, says the service will cost a few dollars per transaction.

eTime: www.etimecapital.com

WebTrends last week released CommerceTrends 2.0, Windows NT-based software for collecting and analyzing data on all visitor activities and customer decisions on e-commerce sites.

The latest version of the product adds the ability to store data directly into an Oracle8i or Microsoft SQL Server 7 database in order integrate data on Web commerce activities with other customer-management information.

CommerceTrends 2.0 costs $25,000 per server, with $5,000 for each additional server.

WebTrends: www.webtrends.com

The **Sun-Netscape Alliance** has begun shipping TradingXpert 3.5, its Java-based application server for managing purchasing, shipping and requests for quotes between trading partners using electronic data interchange, HTML or XML technologies.

The latest version supports digital certificate authentication and the ability to send and receive Portable Definition Format and CAD/CAM drawings as attachments.

TradingXpert starts at $50,000.

Sun-Netscape Alliance: www.iPlanet.com

Videoconferencing takes to the Web

BY JASON MESERVE

People have been waiting for videoconferencing to hit the mainstream since the first video phone was introduced by AT&T many moons ago. Today, product vendors and service providers are turning to the Web to ease the barriers to using videoconferencing on an everyday basis.

Vendors and service providers are leaning on the Web to simplify the scheduling of videoconferences, even to the point at which human conference operators won't be needed. The offerings are also designed to shield customers from equipment incompatibility issues, so it won't matter to the customers that they and the companies they are conferencing with use different video gear. In addition, Web-based offerings can add streaming, data collaboration and other services that might be daunting for enterprises to set up and manage in-house.

Vialog in Andover, Mass., and V-Span in King of Prussia, Pa., are among the companies offering Web-based videoconferencing reservation systems.

Customers can log on to Vialog's www.webconferencing.com to list members of a videoconference and to schedule a conference call. The customer can choose to have all parties dial in to the conference, as is typical of most conferences today, or perhaps more conveniently, Vialog can dial out to connect all parties to the conference. V-Span offers similar reservation services.

"Because we buy our communications service in bulk, we can often dial out cheaper than a user can dial in to our operations center," says Josh Cartagenova, marketing manager at V-Span.

As an added benefit, V-Span can record conferences for future playback and offers data collaboration services for those who want participants to edit documents and files while conferencing.

www.nwfusion.com

MIND YOUR VIDEO
MANNERS

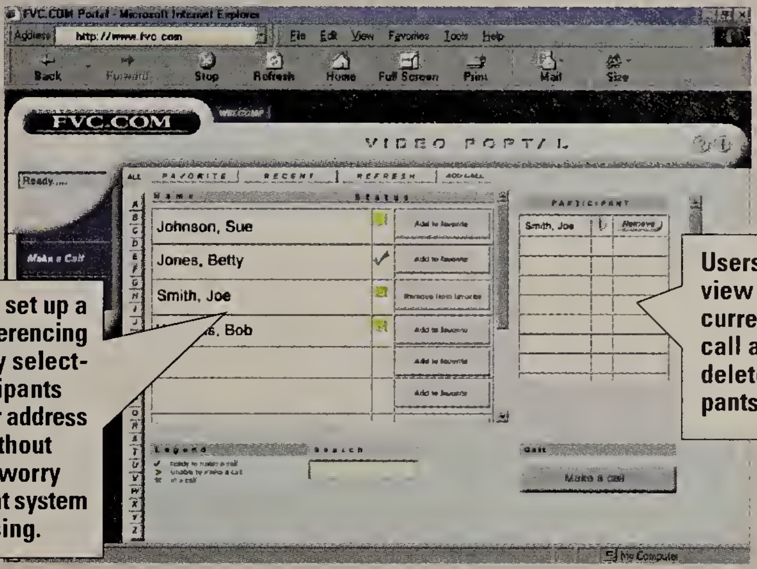
Lessons in video etiquette.

Tips for a successful videoconference.

DocFinder
5724
find it online

FVC.com automates videoconferencing

FVC.com's Video Portal will offer users a personalized page for storing frequently used names and numbers.


FVC.COM Portal - Microsoft Internet Explorer
Address http://www.fvc.com
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Full Screen Print Mail Size
FVC.COM
VIDEO PORTAL
Ready....
Make a Call
ALL FAVORITE RECENT REFRESH
Name Status
Johnson, Sue
Jones, Betty
Smith, Joe
s, Bob
Add to favorite
Remove from favorite
PARTICIPANT
Smith, Joe
Remove
Legend
Search
Call
Make a call
My Computer

Users can set up a videoconferencing session by selecting participants out of their address books, without having to worry about what system each is using.

Users can also view who is currently on a call and add or delete participants as needed.

Both companies help customers overcome problems related to using different videoconferencing gear. Videoconferencing is never as easy as dial and connect. There are systems based on H.323 (IP), H.320 (ISDN) and H.321 (ATM) that all run different compression algorithms and work at different speeds.

Service providers such as Vialog and V-Span have Multipoint Control Units (MCU), bridges and gateways on hand to link video gear based on different technologies.

The American Association of Medical Colleges (AAMC) recently held a videoconference among 20 sites to discuss how its members' residents can manage their graduate school debts. Meeting coordinator Kirsten Bianchi says Vialog's service made it easy to set up the meeting.

"We just gave each site a list of equipment requirements [to make sure their equipment would work with Vialog's], and Vialog handled the rest," says Bianchi, who notes that part of Vialog's service is to make sure each site is "certified" before connecting it. "It's great because our users could either call in or use the Web site to get certified," she says.

While the AAMC has only used videoconferencing twice to hold meetings, it will now start looking at the technology as a more viable option. "Videoconferencing over ISDN is a lot cheaper than travel," Bianchi says.

Andrew Davis, managing partner at Wainhouse Consulting Group in Brookline, Mass., says Web-based videoconferencing services lower the barrier to entry. "Some large users see [setting up videoconferences] as being hard and will welcome farming it out to an expert," he says.

Service providers such as Vialog and V-Span have yet to eliminate human operators to set up conferences. But FVC.com, a Santa Clara hardware, software and services company, has technology in the works designed to let service providers fully automate videoconferences.

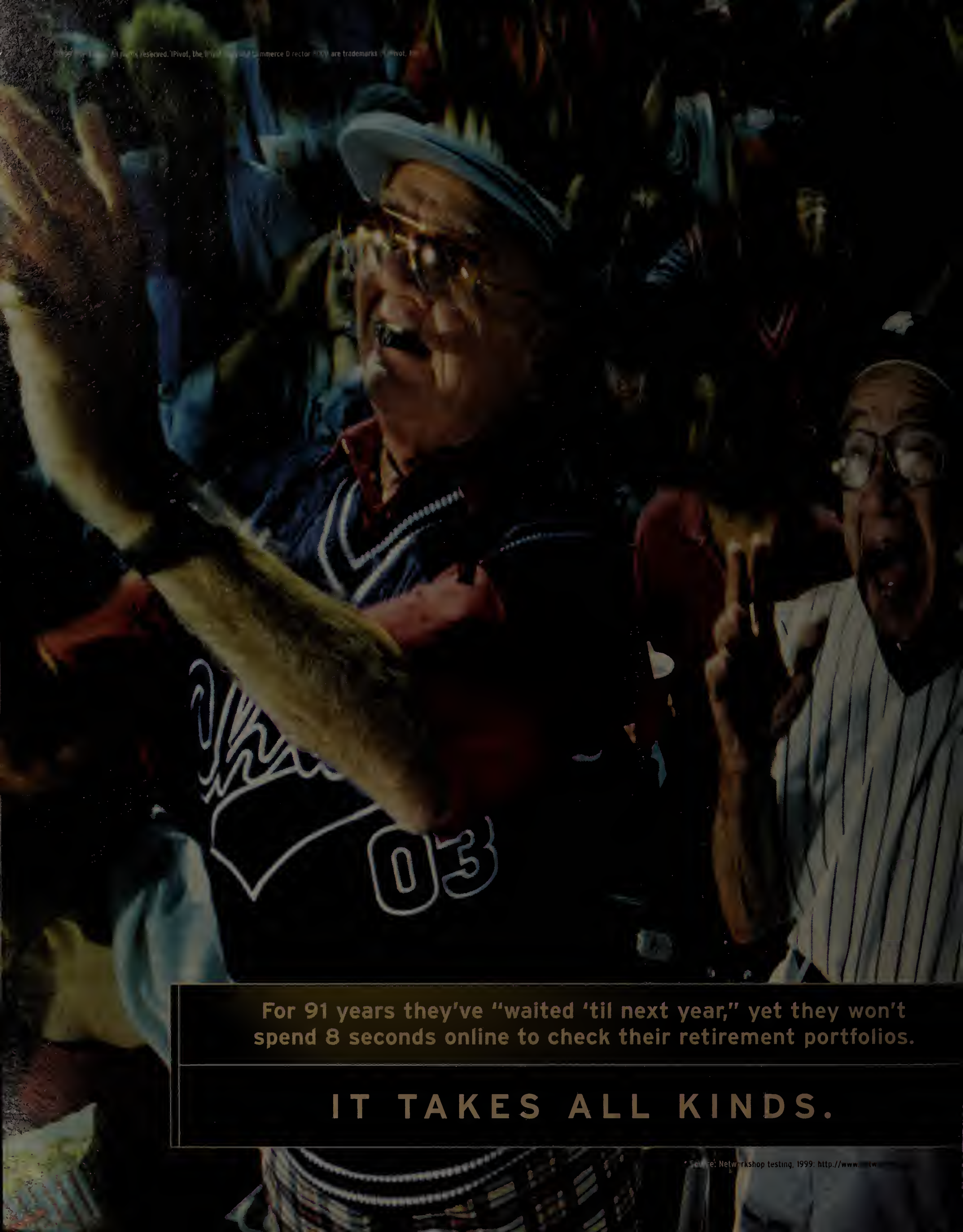
The company's Video Portal offering, currently in beta testing and set for delivery early next year, relies on a Web site to tie together back-end conferencing systems, including MCUs and bridges.

The Web site is similar to MyYahoo in that it gives users their own pages for storing contact names and setting up conferences. Users will be able to click on a set of names and click a button to launch a conference. FVC.com's equipment will support the connections to participants.

FVC.com will offer the Video Portal as a service to carriers or sell all the hardware and software components to service providers that want to bring the technology into their own operations centers.

However, Wainhouse's Davis says it still will be a while before completely automated videoconferencing goes mainstream. "But it is a good sign that a couple of companies are starting to chase the golden ring," he says. ◪

[illegible] reserved. IPivot, the [illegible] Commerce Director [illegible] are trademarks [illegible] iPivot, Inc.


For 91 years they've "waited 'til next year," yet they won't spend 8 seconds online to check their retirement portfolios.
IT TAKES ALL KINDS.
03

* Source: Networkshop testing, 1999: http://www.

Is there a more patient breed than the die-hard baseball fan from Chicago's north side? You would think not. At least until you witness them cursing a Web site running in secure mode.

Which is why we designed a line of Commerce Accelerators specifically for e-commerce. These marvels keep your site zooming along throughout your client's entire secure transaction—instead of slowing down to an annoying crawl. For example, one of the country's largest benefits consulting companies has been able to process 150 times* more encrypted messages since installing our Commerce Director 8000™.

IPIVOT™

www.chicagos-finest.com

To see how much faster things run with IPivot™ and get information on how we can speed up your Web site, visit ours.

Wrestling the NT management octopus

NT Server management is no easy feat, but OnePoint Operations Manager's monitoring and alerting tool can give you a leg up.

BY BOB CURRIER

Managing a large group of Windows NT Servers is sometimes like wrestling an octopus. You don't have enough arms and legs to put up a good fight, and every time you think you've gotten ahead, another tentacle grabs you by the ankles and pulls you down.

We can't give you more arms and legs, but we have found a product that can help you win the NT Server management battle. Mission Critical Software's brand new product, OnePoint Operations Manager, provides NT administrators with a stable and highly scalable centralized management platform for event monitoring and alerting across their NT deployments. Its performance was good enough to earn our World Class Award.

ActiveAgent technology is what makes Operations Manager so effective. ActiveAgents installed on each server report performance thresholds, service status changes and extract information from NT event logs.

Operations Manager can dynamically discover new servers based on defined scanning rules and install ActiveAgents on them. Out of the box, Operations Manager scans the configured list of NT domains at 2:05 a.m., but you can easily change that scheduled scan time. On our network, the scheduled scan found new servers as advertised.

NetworkWorld REVIEW Network management

Operations Manager does not assume that all discovered machines need ActiveAgents installed on them. After a scan is completed, discovered systems are placed in a Pending Installation view in the Management Console. Installations must be approved and processed by a system operator. While this process might sound cumbersome, we found that it kept ActiveAgents from being automatically installed on the machines in our domain that didn't need them.

If you've installed a new server and want to add it to the list of managed machines before the next scheduled scan, Operations Manager makes that easy. A well-thought-out control panel lets you define scan parameters based on specific machines, domain names or wild card combinations of both. We easily added several machines to our managed list this way.

The core of Operations Manager is the Consolidator/AgentManager. The Consolidator runs on an NT 4.0 Server and handles the collection of data from the ActiveAgent software. The Consolidator passes data to the Database Access Server and takes care of event correlation, automated alerts and responses.

We noticed very little impact on overall systems performance from the agents or console, thanks in part to Mission Critical's use of compiled code instead of scripts.

Operations Manager comes configured with more than 5,000 compiled rules that provide event categorization, alerting, and automatic and manual responses. We found the alert module to be very well thought out. You can be notified by e-mail or pager, and you can define different administrators to be notified for different types of events.

Identifying a problem is only a part of the overall diagnostic procedure. Knowing how to correct the problem is at least as important. For this, Operations Manager uses ActiveKnowledge, a huge database of solutions, tips and definitions in an easy-to-understand format. We relied on the ActiveKnowledge database on several occasions when an NT error message reported by an ActiveAgent was too vague.

Installation of Operations Manager is a straightforward process, but it makes use of a large number of components from Microsoft and Mission Critical, all of which must be installed properly and in the correct sequence. We didn't encounter any major problems during the installation, but we suggest taking advantage of Mission Critical's standard offer of an onsite support engineer during installation and configuration.

Mission Critical's documentation was very impressive. We found that the online documentation was well-written, easy to understand and quick to access. The product also provides several automated response options. Using ActiveX scripting, an administrator can have an ActiveAgent trigger a script that can either stop and restart a particular NT service or shut down the entire server.

If you are responsible for more than a handful of NT Servers and are looking for a product that doesn't bog down your hardware, is easy to use and comes with excellent technical support, you can't go wrong with OnePoint Operations Manager.

Currier is director of data communications at Duke University in Durham, N.C. Currier is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review. For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance. Currier can be reached at robert.currier@duke.edu.

NetworkWorld TEST ALLIANCE

ScoreCard

OnePoint Operations Manager	
Functionality (40%)	10
Administration (35%)	9
Performance (10%)	10
Installation (10%)	9
Documentation (5%)	10
Total score	9.55

Individual category scores are based on a sca[illegible] of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

The World Class Award is given to products that sco[illegible] 9.0 or higher.

NetResults

OnePoint Operations Manager

Mission Critical Software
(800) 814-9130
www.missioncritical.com/product/EntEvtAd.htm

$1,495 per managed Windows NT Server

Pros

- ▲ ActiveAgent technology is easy to deploy using automated scan.
- ▲ Agents use few CPU cycles.
- ▲ Extensive set of monitoring rules offered.

Cons

- ▼ Complex product composed of many parts — skilled NT administrators a must.

NetworkWorld World Class

Mission Critical's

OnePoint Operations Manager

Mission Critical's new OnePoint Operations Manager won our World Class Award for its long list of monitoring rules, innovative ActiveAgent technology and low impact on monitored servers.

How we did it

We installed the OnePoint Operations Manager's Consolidator on a Dell PowerEdge 2300 with 512M bytes of RAM, a 400-MHz Pentium processor and Windows NT Server 4. The server also ran Microsoft SQL Server 7.0, Windows NT Option Pack 4.0, Microsoft Management Console and Microsoft Transaction Server, all of which are required by Operations Manager. We used a Dell Optiplex GX1 running NT Server 4 as our Primary Domain Controller and primary management console. Mission Critical's ActiveAgents were installed on five NT Workstation 4 machines. We used Operations Manager to monitor system performance and analyze event logs.

www.nwfusion.com

ON THE ALERT

Download: Test-drive OnePoint Operations Manager's free demo.

Buyer's Guide: See what won out in a comparison of monitoring and alerting tools.

DocFinder find it 5637 online

Global Finance September 1999
Best Global Telecommunications Company
Wired Index June 1999
One of the top 40 companies to lead the new economy.
Get the connection?
One of the top 100 IT companies for 1999.
Business Week June 1999
Number 2 ISP in the U.S.
Data Communications June 1999

CABLE & WIRELESS

We're proud to say that there's only one connection between these four quotes. And that's Cable & Wireless.

We take our role as a global leader in Internet and data communications seriously. From ATM to IP VPN to Web hosting, Cable & Wireless delivers services that improve your business on line, off line and in terms of your bottom line.

So if you want to succeed in the world of e-business, talk to Cable & Wireless. We've got the connections to deliver net results.

Cable & Wireless.

Get the connection.

Visit www.GetTheConnection.com

©Motorola Inc. 1999 All rights reserved. Motorola, ColdFire THE HEART OF SMART DigitalDNA and the DigitalDNA logo are trademarks or registered trademarks of Motorola, Inc
The PowerPC name and logotype are trademarks of International Business Machines Corporation and are used by Motorola, Inc. under license therefrom 3Com is a registered trademark of the 3Com Corporation All other logos are used by permission and are trademarks or registered trademarks of their respective companies

Some of the biggest names in the business
come to us for smart networking solutions.
We're glad to chip in.

DigitalDNA™
from Motorola

THE HEART OF SMART.™

If you get excited just thinking about the possibilities for networking and computing, you're our kind of designer. And we're happy to connect you with all kinds of smart solutions. DigitalDNA technology from Motorola is more than chips. It's software, systems and the ideas of thousands of innovative engineers dedicated to helping create the next generation of routers, switches, servers, modems, desktops and more. You'll find DigitalDNA in leading-edge technology like 0.10μm copper interconnect CMOS-based solutions. The world's fastest copper interconnect SRAMS. And a wide portfolio of highly scalable PowerPC cores. So whenever you need a smart networking solution, you know the name to turn to. www.digitaldna.motorola.com

PowerPC • SRAM • Communications Protocol Modules • DSP • LDMOS/RF • ColdFire

MOTOROLA EMBEDDED SOLUTIONS

'Net Insider . Scott Bradner

TAPPING THE INTERNET

Last week I wrote about the debate in the IETF over wiretapping the Internet. Two undercurrents of that debate are worth exploring in greater detail: that legal intercept (as it's euphemistically called) for voice is only the first step in the general tapping of the Internet; and that the desire for intercept may be thwarted by the Internet architecture anyway.

A strong thread that ran through the discussion on the IETF's raven mailing list (If you don't know where the mailing list name comes from, then re-read your Edgar Allen Poe) was the fear that the call for voice intercept was only a stalking-horse for governments' real goal — to do general tapping of the Internet. This thread was second only to one that claimed wiretapping violated basic human rights and that governments had no intrinsic right to do this.

Unfortunately, however justified this feeling may be, it does not stop governments from making laws that mandate just this sort of thing. And one can expect that laws will be coming soon mandating that ISPs be ready to tap any Internet datastream. Claiming that governments do not have the right to pass such laws is unlikely to change the fines that the ISPs will have to pay if they fail to comply.

The second undercurrent of the wiretapping discussion, as I mentioned, has to do with the Internet's architecture, which is basically point-to-point.

Data flows from one edge device, such as a Web server, to another, such as a PC running a Web browser. In some cases, there may be a device in the middle, such as a Web proxy, through which some of the data flows.

But such a device is not a required part of the architecture. In the case of Internet telephony, data almost always flows directly between the end points. Signaling information might be sent to some central servers, but the data flows directly between the end points for normal person-to-person calls. In the case of conference calls, the data does have to go through a central mixing server.

But the lack of a central data forwarding server for handling normal phone calls means that there is no easy way to tap IP calls without letting the user know it is happening. At the same time, there is no central server to send you a bill. I have been told that some regional telephone companies are using the argument that point-to-point IP calls are hard to tap in their effort to get the Federal Communications Commission to mandate that the data for all phone calls go through central servers. The side benefit that the telephone company can then bill for such calls is, of course, secondary.

This architecture, coupled with the availability of good encryption software for the end nodes, may mean that people who don't like the idea that the local government, or anyone else, is listening in can keep that from happening.

Disclaimer: Harvard's architecture runs from Richardson to Le Corbusier, but does not facilitate wiretapping. The above hope is my own.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

Why stream when you can burst?

Your network has the bandwidth; your computers have the storage. So why are you still watching unreliable video with low-quality audio?

By optimizing lower-cost storage and your network bandwidth, Burstware® delivers high-quality, uninterrupted content in Faster-Than-Real-Time℠. Quality is guaranteed because the viewer is isolated from network degradation.

Burstware intelligently manages your network resources, increasing overall network throughput. Imagine supporting more viewers with less bandwidth!

To find out exactly how Burstware can give you high-quality networked video and audio, call us at 1-888-54-BURST, or visit our website at www.burst.com.

burstware®
Instant Video Technologies, Inc.
www.burst.com

IVT
500 Sansome St. San Francisco, CA 94111
phone: 1.888.542.8778 email: sales@burst.com
Burstware and Instant Video are registered trademarks of Instant Video Technologies, Inc. Patents pending and issued, contact IVT for details.

"...SPECTRUM Enterprise Manager has the edge in customer satisfaction."

—*NetworkWorld*, September 1999

Thank you for making
SPECTRUM #1

In *NetworkWorld's* recent survey on network management, customers rated SPECTRUM the number-one management solution over Hewlett Packard, Tivoli and Computer Associates in four major decision-making categories:

- Scalability
- Integration
- Management Capabilities
- Overall Value

In fact, network managers gave SPECTRUM an "A" grade of 90, putting us at the head of the class! SPECTRUM also scored significantly higher than Hewlett Packard, Tivoli and Computer Associates in:

- Configuration Management
- Problem Management
- Network Optimization
- Systems Optimization
- Automated Diagnosis
- Alert Correlation

NetworkWorld Reprint

NETWORK MANAGEMENT

To receive your free copy of the *NetworkWorld* survey on network management, give us a call toll free at **1-877-437-0291**. You can also download the survey off the web at **www.spectrummgmt.com**

SPECTRUM®

Headquarters: 121 Technology Drive, Durham, NH 03824 • P: (603) 337-7000 • F: (603) 337-5734 • Internet: www.spectrummgmt.com

Plug it in, turn it on. Now adding a file

Quantum® Snap Server™ is the ideal solution for upgrading your network storage. It offers the perfect combination of quick and easy installation at prices far below what you would pay for a traditional NT server. It's pre-configured to work in all major network environments, which means you really just plug it in and turn it on – with no network downtime. In fact, the Snap Server is so hassle-free, it installs in less than 15 minutes! Simply call **1-888-343-SNAP** or visit our website for more information.

Quantum®
If it's important to you, save it with us.

MVP Winner

BEST

Network Computing BEST VALUE

©1999 Quantum Corporation. All rights reserved. Quantum and the Quantum logo are trademarks of Quantum Corporation, registered in the U.S.A. and other countries. Snap Server is a trademark of Quantum Corporation. All other product names are trademarks of their respective companies.

server is a Snap!

Performance Pentium-class processor with
- Quantum® Ultra ATA hard disk drives
- RAID 0,1 (striping, mirroring)
- Unlimited license, easily supports 100 clients

Compatibility Simultaneous support for Windows 2000, NT, NetWare, UNIX and Macintosh networks and clients across TCP/IP, IPX, NetBEUI and AppleTalk

Network Security Integrates with NT Domain Controller and NetWare Bindery servers or local user list

Guarantee Unconditional 30-day money-back guarantee on all Snap Servers, plus 3-year parts & labor

Price

20GB – $999

40GB – $1799

Snap!™ server

www.snapserver.com

XML: The new face of e-commerce

BY ELLEN MESSMER

ELECTRONIC DOCUMENTS

Users, vendors bonding together to develop common XML procedures.

XML, a way to code documents for easy transfer between applications, is widely seen as a key enabling technology for e-commerce in the future.

Today's HTML-based Web just can't provide the flexible searching and data exchange that format-neutral XML conveys. But the World Wide Web Consortium's (W3C) XML 1.0 specification, now more than 1 year old, hasn't been enough to grease the wheels of e-commerce. Trading partners still have to agree on what each XML-based business document will look like in order to ensure the smooth exchange of information online.

If this challenge sounds familiar, that's because it's the same one faced when using an older e-commerce technology, electronic data interchange. For years, EDI users met in long sessions to hammer out document types, such as purchase orders and shipping notices, that became the X12 or EDI for Administration, Commerce and Transport (EDIFACT) standards used today by the transportation, manufacturing, grocery, retailing and computer industries.

Many large corporations, such as Wal-Mart, Mobil and General Motors, require their trading partners to use EDI documents for certain business transactions. Even though EDI data can be captured through Web forms these days, EDI is still considered time-consuming and expensive to deploy between trading partners. There are already signs XML may usurp EDI's role in e-commerce.

When start-up ClubComputer in Nellies Ford, Va., began selling a large number of PCs over the Web, the company was asked by its distributor, Merisel, to start using EDI instead of e-mail to send purchase orders to Merisel representatives.

This would eliminate the need for Merisel representatives to retype ClubComputer's data into back-end ordering systems.

"When I looked at the expense of that, mapping the EDI data and paying for the value-added network, I said, 'I can't really afford that,'" says Dennis Tracz, CEO of ClubComputer. "And we really don't have the expertise for [working with EDI]."

Rolling out EDI would have cost ClubComputer roughly $25,000 per month, Tracz says. So the company instead joined an early effort by Merisel to receive sales data using XML for computer-to-computer exchange between sellers and the distributor.

Using OnDisplay's XML repository, ClubComputer can transfer order data it gets over the Web directly into a Merisel enterprise resource planning system. Merisel generates shipping notices and other updates and sends them to ClubComputer's OnDisplay repository using XML.

While at $100,000 the OnDisplay XML repository doesn't come cheap, Tracz still thinks he's doing better than he would with EDI.

While most companies have yet to begin rolling out XML technology across their enterprise or inter-enterprise networks, the word is getting out about XML's potential.

Defining XML documents

The following is a breakdown of XML-focused organizations and companies.

Organization or company	Standard development activity
Ariba	Developing Commerce XML, a set of XML business documents.
BizTalk.org	Repository for business documents based on Microsoft's XML Data Reduced Schema.
Collaboration Planning, Forecasting and Replenishment Committee	Grocery and retailer industry group designing XML documents.
Customer Profile Exchange	Developing XML-based customer profile specification for use in personalizing content in e-commerce.
Data Interchange Standards Association	EDI standards group mapping X12 EDI standards to XML.
HL7	Health care industry group has begun work on XML documents for use by hospitals and insurance companies.
OASIS	Industry group joined by United Nations to standardize XML documents.
RosettaNet	Group defining XML business documents for use by sellers and distributors in the computer and electronics industries.
The Open Applications Group	Vendors and users that posted XML DTDs for use in e-commerce.
World Wide Web Consortium	Nearing completion of XML Schema, an architecture for creating business documents.

Baylor Health Care System, a hospital chain headquartered in Dallas, is testing Sequoia's XML repository to store all patient transcription records it receives. The idea is that in the future, Baylor can make these available to what it calls the "physician's Webtop," a network client for doctors.

Mike Miller, Baylor's chief technical architect, says he's following the lead of the health care industry's HL7 standards group on how XML should be used. "The HL7 standards group decided the third version of its standard — which has so far been similar to X12 EDI — will be based on XML," Miller says. He expects to see medical records forms based on HL7 work during the upcoming year.

The computer and electronics industries are among the most determined to make XML a key part of their supply chain processes. About 100 companies, including Intel, SAP, 3Com, Hewlett-Packard and Federal Express, are corporate members of the RosettaNet consortium, which has the goal of completing a full set of XML-based business documents and processes by next February.

RosettaNet CEO Fadi Chehade, who used to run Ingram-Micro's EDI and e-commerce group, explains RosettaNet's reason for being: "There just aren't enough bodies and time to do EDI on the Web."

RosettaNet is busy defining about 100 "Partner Interface Processes (PIP)," XML-based messages detailing ordering, returns and other practical matters of concern to the computer and electronics industries. However, just coming up with these PIPs won't be enough because they will need to be used with either the simplest of XML documents, called Document Type Definitions (DTD), or more complex XML constructs called Schema.

There are now a multitude of industry groups defining DTDs and Schema, and standardization has become a problem.

The W3C, which doesn't formally consider itself a standards body, expects to soon complete its XML Schema specification, which should provide a baseline for XML document interoperability from application to application.

Meanwhile, Microsoft has rushed ahead of that effort with its XML Data Reduced (XDR) Schema, which may be on its way to becoming a de facto standard. Industry groups designing their own DTDs or Schemas are proliferating like mushrooms after the rain (see graphic).

Chehade worries that XML may be turning into a modern day Tower of Babel. "The problem is to get a dialog between two machines, and we need to agree on the words, and we need the grammar," he says. To stay in sync with current major technical efforts, RosettaNet is readying three versions of its PIPs: one for use with DTDs, one for the W3C's XML Schema and another for Microsoft's XDR.

Vendors are addressing the Tower of Babel issue by rolling out business-to-business application servers designed to convert between various XML data types. Bowstreet, for example, boasts that its Web Automation Factory can handle the XML document exchange challenge through a template-based technology. Service providers and product makers including CommerceQuest and WebMethods make similar claims. ◪

Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

How to give DSL concentrators a boost

BY RICHARD SEKAR

Carriers can meet growing bandwidth demand by using digital subscriber line concentrators that employ an Inverse Multiplexing (IMUX) capability, also known as DSL bonding, to turbocharge business DSL services. IMUX bonds up to eight copper pairs to deliver high-bandwidth services — up to 12M bit/sec — for little more than the cost of a traditional dedicated T-1 connection.

IMUX becomes an important option as competitive local exchange carriers (CLEC) launch symmetric DSL (SDSL) and ISDN DSL (IDSL) services nationwide to deliver business-class communications services that fill the bandwidth gap between 56K bit/sec and 1.5M bit/sec.

There are three main applications driving vendors to incorporate IMUX functionality into their DSL concentrators. First, IMUX eliminates the problem of declining DSL speeds at longer distances. For example, serving a midsize business located more than 24,000 feet from a central office may cost a carrier $500 to $900 per month for a T-1 circuit. But the 320K bit/sec available at that distance from SDSL may not be sufficient given the company's growing bandwidth demands. By bonding up to five DSL lines, it costs the carrier only $25 to $100 per month to offer the customer 1.54M bit/sec service.

Second, IMUX enables CLECs to offer speeds of up to 1.15M bit/sec to IDSL customers served through a Digital Loop Carrier. Until now, these customers have been limited to a top rate of 144K bit/sec.

Third, the IMUX capability lets carriers sell "up market" to larger organizations that require fractional T-3 speeds. By bonding together as many as eight DSL lines, a CLEC can offer speeds as fast as 12M bit/sec symmetric for only $40 to $160 per month.

While the multilink PPP protocol (MLPPP) or the Multi-Link Frame Relay (MFR) User-to-Network Interface draft standards under review by the Frame Relay Forum could become the basis for IMUX, MFR is fast becoming the solution of choice. MLPPP enables only Internet access; it does not support the end-to-end private virtual circuits (PVC) that frame relay service requires.

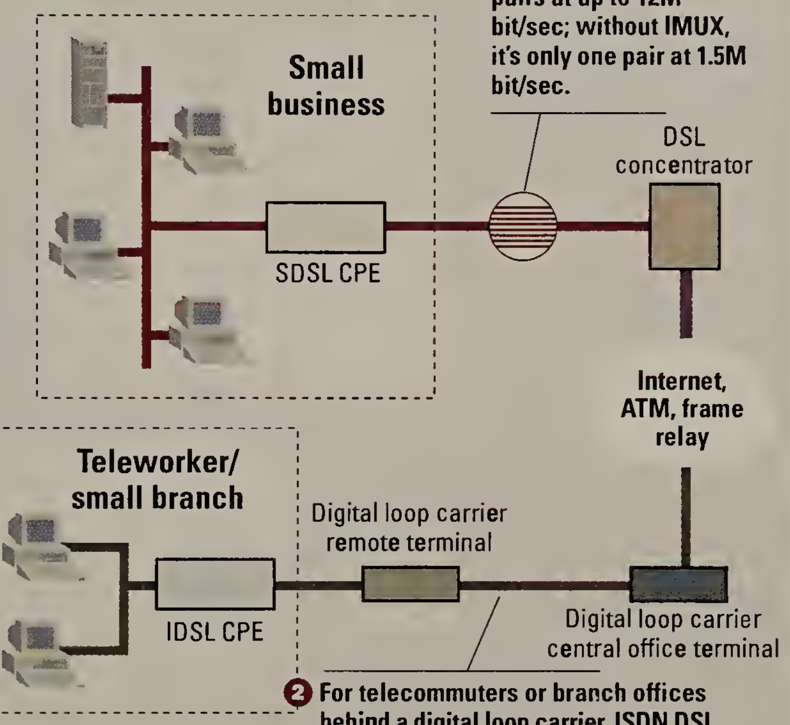
MFR enables Internet access and frame relay services by provisioning end-to-end PVCs.

MFR performs load balancing across multiple bonded DSL lines. It also actively monitors the performance of the bonded connection. If one line goes down, MFR automatically distributes the load across the remaining lines, then transparently restores the bond and balances traffic when the line comes back up.

UP CLOSE

What IMUX can mean in a DSL network

Digital subscriber line concentrators that include an inverse multiplexing (IMUX) capability will allow carriers to expand the market for DSL services, provide bandwidth alternatives between 56K bit/sec and T-1, and achieve cost savings that could be passed on to customers. Illustrated here are a few of the benefits of IMUX in a typical DSL network.


Small business
SDSL CPE
DSL concentrator
Internet, ATM, frame relay
Teleworker/ small branch
IDSL CPE
Digital loop carrier remote terminal
Digital loop carrier central office terminal

① For a small to midsize business customer, symmetric DSL (SDSL) is possible on up to eight pairs at up to 12M bit/sec; without IMUX, it's only one pair at 1.5M bit/sec.

② For telecommuters or branch offices behind a digital loop carrier, ISDN DSL becomes possible for up to eight pairs at 1.15M bit/sec; without IMUX, it's one pair at 144K bit/sec.

Finally, a DSL concentrator that implements MFR can automatically notify the network operations center of any changes, along with customer names and addresses, for proactive customer management.

While the DSL concentrators can now bond up to eight copper pairs, customer premises equipment (CPE) currently supports two bonded pairs for access rates of up to 3M bit/sec with SDSL. IDSL CPE enables access rates of up to 288K bit/sec. CPE for four bonded pairs will be available in 2000. Because products are based on the MFR standard, many different types of CPE from several third-party vendors will be available and will interoperate seamlessly with DSL access concentrators that employ MFR.

The availability of turbocharged SDSL and IDSL will enable a variety of high-speed Internet access applications, such as streaming video and distance learning. Financial services companies, for example, can use streaming broadcasting to provide up-to-the-second financial information. Telecommuters will finally get the access speeds they want at a price they can afford.

Turbocharged SDSL provides CLECs with a major opportunity to switch frame relay users to a less-expensive, high-speed IP service without throwing away their frame relay routers. These customers can connect their existing routers to an MFR-based DSU with a V.35 interface that connects multiple lines to the DSL concentrator. IMUX even enables voice services to run over the same circuit as frame relay.

By multiplying bandwidth, IMUX greatly expands the potential market for DSL services, scales to meet subscribers' needs for higher bandwidth and makes possible a host of new applications.

Sekar is director of product marketing at Copper Mountain Networks. He can be reached at rsekar@coppermountain.com.

Ask Dr. Intranet

By Steve Blass

I work at a local university teaching an MBA telecom/Internet services class for non-techie MBA students.

One of the problems I have is finding high-level (yet technical) descriptions of various telecommunications services including e-mail, electronic data interchange, Internet services, intranets and extranets.

Is there some source that provides up-to-date descriptions of the types of services above? The emphasis in my class is that all business graduates should possess a sound understanding of the various telecommunications technologies and applications.

Via the Internet

Finding the right level of technical detail for business people can be a challenge.

My No. 1 recommendation is Network World Fusion (www.nwfusion.com), where you can connect your students to practicing professionals through the mailing lists, discussion forums and reference materials.

Other Web sources for white papers, articles and course syllabi include Web sites for technology firms, journals and education sites such as mot.com, lucent.com, qualcomm.com, sprintbiz.com, harbinger.com, hbs.edu, and vance.mis.uwec.edu/mba.

What's more, a Web search on "MBA information technology syllabus" leads to long lists of MBA program pages from which to glean additional links.

Blass is a network architect at Sprint Paranet in Houston. You can reach him at dr.intranet@paranet.com.

Gearhead — inside the network machine . **Mark Gibbs**

IN CASE OF EMERGENCY, FTP

Last week, we embarked on a journey of discovery. We were blazing a trail of destiny, a path to glory, a march to kismet. Actually, we were discussing FTP and discovering that a journey of a thousand miles begins by running out of gas and getting a flat tire. Be that as it may, we will continue our quest for the details of FTP.

We got as far as logging on to the remote FTP server but really only glossed over the process, so let's look at that in detail: First we fire up the FTP client. Under Windows 98, you do this by going to the Start menu, selecting "Run" and entering "ftp" for the command. This will run the Microsoft FTP client unless you have changed the configuration or installed an alternative FTP client (the Microsoft FTP client has a load of command-line options worth checking out).

A DOS window will open and you will see the prompt "ftp>" — other vendors' implementations will probably present themselves differently.

There are 17 commands you can use. The command "open" is used to start a session with another machine as in "open silcom.com." Watch out for misspelling the target machine's name (or IP address — you can use either) because you will have to wait for the Domain Name System lookup to fail, which can take a while, usually with no indication of what's happening.

If the target is found, you will be asked for a name. A default is offered for anonymous access, or you can give your account name. You then have to give a password — your e-mail address for anonymous access or your account's password.

Assuming you clear those hurdles, you'll find yourself back at the prompt. If you're starting to think this is a pretty crude interface, you're right. It all came out of the Unix world and as we know, Unix types think that graphical user interfaces (GUI) are for wimps, and real programmers actually like typing whenever possible.

Be that as it may, you now need to select the correct working directory. To do this, first check the default directory — enter the command "pwd" (print working directory) at the prompt. If that shows you're not in the right place, you need to use the command "cd" to change directory. You can see directory contents with the "dir" command and delete files using the "del" command.

You might also want to make sure your local default directory is the correct one using the command "lcd" as in "lcd c:\mydir."

Now you're in the right place on the client and on the FTP server, and you've rid yourself of the stuff you don't want on the server. You're almost ready to transfer files. But before you do that you need to specify what kind of files you're transferring.

As odd as that may seem, there's no guarantee that the ftp program will default to transferring in binary mode (the alternative is ASCII mode, which strips the high bit off each byte). To make sure you're transferring in binary mode, enter the command "binary" at the prompt. Again, this is a hangover from FTP's Unix origins.

So we're now ready to send or receive files. To send a file, issue the command "put" as in "put myfile.txt." To retrieve a file, the command is "get" as in "get yourfile.doc."

If you're transferring large files and you want to get an idea of what's happening, you can issue the command "hash," which prints a pound symbol for each block transferred. To quit FTP, the command is "quit."

For the slightly more audacious geek, multiple files can be sent and received using "mput" and "mget" with wildcards. The adventurous may resort to the more earthy and workaday commands that are sent directly to the server — there are 33 of these, and you are advised to find a good textbook to come to grips with these little gems.

So why would you want to know all this apparently obsolete stuff about FTP? The answer is obvious: You won't always have GUI-based FTP clients around, and a knowledge of FTP — and for that matter any of the other brutal Unix-style clients — could save your ASCII sometime in the future.

Arcana to gb@gibbs.com.

Network World Fusion Spotlight

News, tips and tools from our Web site

Help Desk

Does Microsoft Internet Information Server (IIS) have to be single server, or can it be a primary domain controller (PDC)?

A reader says he installed IIS on single-server NT 4 and had no problems. But as soon as he made it a PDC of NT 4, password authentication issues cropped up.

Find out what Ron Nutter suggests in this week's Help Desk.

DocFinder: 5727

Women in IT

The ranks of women in IT are thinning despite an increase in job openings. Why? We've got some of the foremost experts in this field online this week to discuss this critical issue with you.

Join our online debate with Kelly Carnes of the Department of Commerce, Anita Borg of the Institute of Women in Technology, Kitty Didion of the Association for Women in Science, and Linda Scherr of IBM to find out where all the women are.

DocFinder: 5728

Users question Qwest

In a recent article, Senior Editor David Rohde took the lid off Qwest Communications' growing pains. The nation's newest carrier is steeped in customer service problems, installment setbacks and infrastructure woes.

And users have been quick to jump into our forum with their thoughts: "Qwest has great commercials to mask the real issue — peering. Bandwidth that goes nowhere is like an eight-lane highway with about five exits for 3,000 miles."

However, some readers are confident that the start-up still has a chance: "If Qwest gets their act together, they will grow like wildfire." What do you think?

DocFinder: 5647

Instant frame relay search

Tired of sifting through an endless series of Web pages to get frame relay information? We've culled hundreds of Web pages to bring you a search engine that focuses solely on frame relay. You'll find primers, white papers and product information from the top vendors, as well as our archives.

DocFinder: 5625

Comdex

So you missed the flying penguins? Don't worry, we've got all the Comdex news for you. From Scott McNealy's victory dance to a band of pesky nerds, you can quickly get up to speed on the latest news out of Las Vegas. Find out why Linux was king, how small businesses are feeling the Web fever, and why Cisco has a shrinking feeling about wireless routers.

DocFinder: 3745

In the Works

Last week, we introduced you to the heads of Argonne National Labs. This week, we go inside one of the leading corporate research facilities. Intel Architecture Labs is on the cutting edge. From policy-based routing to multimedia conferencing, Intel's researchers are blazing a trail.

Abel Weinrib, an executive at the labs, will tell you how the microchip giant is making its name as a network know-it-all.

DocFinder: 5725

Help Desk

Ron Nutter is standing by to answer your networking questions. Read his column every week on Fusion **DocFinder: 2450**

www.nwfusion.com

SECURITY

INDUSTRIAL STRENGTH INTERNET

In today's Internet economy, success depends on the quality of your Internet infrastructure. Globix Internet Data Centers and high-speed network are engineered to deliver all of the reliable power, performance and physical security you need and much more.

At Globix, you'll have confidence that your Internet business is protected and secure at all times. Security begins with professional guards on site 24 x 7 x 365. ID key cards, biometric scanners, and closed-circuit cameras control access and monitor restricted areas. There are no master keys to our reinforced steel cabinets and cages. And for complete environmental protection, FM200 dry fire-suppression systems and fully redundant Liebert climate control systems are standard.

Industrial strength security engineering is just one of the many Globix advantages. So, before you invite millions of customers to your e-business, or launch your mission-critical Internet applications, call us for a free consultation. Or, arrange a tour of one of our state-of-the-art Internet Data Centers and see the Globix difference for yourself!

GLOBIX™
The Global Internet Exchange

1-877-7-GLOBIX, ext.1448 • www.globix.com

Co-Location • Web Hosting • Dedicated Access • Streaming Media • E-Commerce • Internet Security/VPNs

"Globix" and the stylized "G" logo are trademarks of Globix Corporation. © Copyright 1999 Globix Corporation. All Rights Reserved. NASDAQ: GBIX

Editorial

This line is your line, this line is my line

The DSL movement got a big boost two weeks ago when the FCC ordered incumbent local exchange carriers to let competitors deliver DSL over lines the LECs use to deliver plain old telephone service (POTS).

Line sharing, as it is called, should drastically reduce the cost of residential DSL by reducing the wholesale fees DSL carriers pay to use LEC wires.

DSL pioneer Covad, for example, today pays about $20 per month, per household for each two-wire LEC facility it uses to deliver its digital subscriber line service. Often those two wires are a spare pair in the bundle serving a given house, but if the household already has two phone lines, the LEC has to run a new wire.

But some LECs have been setting up DSL shops and deploying service by clamping DSL gear on existing POTS lines for little or no fee. Competitors argued that it was impossible for them to compete on price if they were forced to use separate, more expensive wire pairs.

With line sharing, the incumbents can only charge competitors what they charge their own DSL groups to share existing lines. Covad, for example, expects to pay anywhere from 0% to 50% of what it pays today for LEC facilities as a result of the new ruling.

While retail DSL rates don't mean much to corporate users like you, the ruling is nonetheless important for a number of reasons:

- Lower DSL prices will make the service more popular with residential users, and the resultant demand should lower hardware costs and lead to further service/product innovation. (How about a single phone line delivering POTS, a few spare phone lines derived from the DSL channel AND a big fat data pipe?)
- The DSL footprint should grow as existing carriers and new entrants are attracted by the market sweetener, meaning DSL becomes a more pervasive option for employees working from home.
- Installation intervals should plummet because line sharing means DSL can be provisioned over existing wires. This will be a boost to Covad and others working toward a self-provisioning model driven by the Web — you order service online, the service is turned up, and the CPE is mailed to the remote user who simply plugs it in.

While benefiting residential users in the short term, line sharing will ultimately pay dividends for corporate users. The FCC is to be commended for going against the wishes of the powerful LECs with this decision.

— John Dix
jdix@nww.com

Message Queue

BURDEN OF PROOF

In his "Face-off" column arguing why Microsoft should not be split up (Nov. 15, page 18), I was flabbergasted by Hillard Sterling's claim that the Department of Justice "has not satisfied its burden of showing that integrating the browser does not create any plausible consumer benefit." Excuse me, but Sterling has this backward. The Justice Department cannot prove that something does not exist. You cannot prove that Santa Claus does not exist; neither can the Justice Department prove that no benefits exist.

It is up to Microsoft to prove there are benefits. After all, they are the experts; they integrated the operating system and browser and have made the claim that there are benefits to the integration. During the trial, Microsoft listed 11 items that "proved" the benefits of integration. However, when pressed by an expert, Microsoft was unable to list one benefit of the integration. In addition, an internal e-mail message proved that the purpose of the integration wasn't to benefit the end user.

The only "benefits" Microsoft demonstrated that were caused by the integration were noted by Judge Jackson: that the integrated operating system was slower and more unstable. Perhaps Sterling feels fondness for a company that purposely adds misfeatures to eliminate a competitor, with no benefit for the user. But most of the world does not agree.

Bruce Barnett
Clifton Park, N.Y.

GET A LIFE

Regarding your "Management Strategies" story "Asking the right questions" (Nov. 8, page 54):

Although the chart accompanying the article purports to advise how to ask "illegal" questions in a legal manner, were I to be asked some of those questions I would respond similarly nebulously.

One rephrased question that is particularly rankling: "Do you have responsibilities other than work that will interfere with specific job requirements?"

I'd answer, "Yes." If further pressed, I'd respond, "I expect to have a life outside of work."

I expect to earn my company's respect and my pay, but the question, as phrased, implies slavery to me.

Craig Paul
Technical support programmer/analyst IV
University of Kansas Computer Center
Lawrence, Kan.

WHERE'S UNIX?

In the article "Unix smokes with Gigabit Ethernet" (Nov. 1, page 66), the testers used only NT boxes as clients. Why no Unix boxes?

This test doesn't show anything except that the testers know how to set up an NT box on a network and copy stuff from a server to a client. If this were a real test, you would have had other Unix boxes there to act as clients because everyone knows that NT can't handle Gigabit Ethernet.

Dino Amato
Systems administrator
Carey Color
Medina, Ohio

Michael Hommer, Mier Communications' project testing manager, responds: The gigabit throughput test we conducted was designed to assess the capabilities of the server, not the client machines.

Consequently, had we used Unix clients, we would have obtained the same server throughput results, albeit with fewer clients. Furthermore, we later tested the server throughput rates with more clients and with a different mix of these, and this yielded no appreciable difference in recorded throughput for the server.

WE KNOW YOUR NAME

Regarding Mark Gibbs' "Backspin" column "Bring me the head of Anthony T!" (Oct. 18, page 90): MSN probably got Gibbs' e-mail address from his Microsoft product registration — even if he unchecked the box indicating a desire for e-mail contact/updates. That's what has happened to a lot of other folks.

There's only one way to fight this — with widespread bad publicity and refusal of patronage.

Joe Katzman
Senior consultant
KPMG Consulting LP
Toronto

Send letters to nwnews@nww.com or John Dix, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

www.nwfusion.com

MORE ONLINE

Letters about voice over IP and other topics.

DocFinder 5723
enter online

Totally Unplugged . Ira Brodsky

HOW THE INTERNET COULD SAVE YOUR LIFE

Thanks to the Internet, consumers can make informed choices about their health care.

I know this from experience. About a year ago, my son suffered an unexpected complication from what was supposed to be a straightforward operation. After three weeks, it became painfully obvious that no one at the hospital knew how to fix the problem.

I sent a message to an e-mail discussion list for people affected by a specific genetic condition that runs in my family. Although my son's complication was rare, it took less than 48 hours to locate three people who had the same problem. Others recommended specialists or just offered much-needed encouragement.

As we contemplated a second operation, we used the Internet to identify and compare qualified surgeons. Meanwhile, another surgeon at the hospital tried to intimidate us into having him perform the operation the very next day. I am certain that without the 'Net we would have been susceptible to such scare tactics. Using the Web, we found a doctor in Baltimore experienced in our family's genetic condition and our son's problem.

But this personal anecdote represents just the tip of the iceberg. Numerous start-ups are using the Internet to provide information to patients and their families, streamline billing, help doctors and nurses stay on top of the latest therapies, and ultimately create standardized medical records that can be accessed anywhere in the world. Web sites designed to empower consumers include Medicine Online (www.medicineonline.com), Medscape (www.medscape.com) and drkoop.com (www.drkoop.com). These sites not only offer basic medical information, they also sell insurance, prescription drugs and books; help locate physicians; and even enroll participants in clinical trials.

WebMD (www.webmd.com), Healtheon (www.healtheon.com) and Mede America (www.mede.com) offer services for health care providers, administrators and insurers. These sites specialize in reducing administrative costs through automation and facilitating information exchange within the industry.

Health Hero Network (www.hhn.com) sells a home health appliance, "the Health Buddy," that facilitates in-home patient monitoring, medication and supply reordering, and communications between care givers and patients. WellMed (www.wellmed.com) and HealthMagic (www.healthmagic.com) are developing standardized medical records that can be accessed with the patient's permission.

The Internet is the greatest self-help tool ever invented. Ideally, it will lead to a future in which health care providers compete to deliver high-quality, low-cost services to well-informed consumers. But that won't happen as long as people remain addicted to a system that discourages comparison shopping. It's time to start believing we can and must take control of our own health care. Otherwise, a lot of great technology will be wasted on filling out forms.

Brodsky is president of Datacomm Research in Chesterfield, Mo. He can be reached at ibrodsky@datacommresearch.com.

Above the Cloud . James Kobielus

SELF-DESTRUCTING E-MAIL: PRAGMATIC OR PARANOID?

Who among us hasn't, on one occasion or another, wanted to take back something we said? It's a universal desire, this urge for selective retraction of unfortunate comments, for the ability to expunge some verbal embarrassment from the public record and the memories of our contemporaries.

Now imagine what the world would be like if everyone could do this all the time, if everyone could shoot their mouths off without regard for bad consequences and then conceal all evidence of their irresponsibility. The e-mail industry is on the verge of granting this desire, in the form of "self-destructing" or "self-retracting" e-mail.

The pioneering company in this area is the cutely named Disappearing, Inc. and lets users of leading e-mail products selectively retract messages they have sent, even after those messages have been received, read and archived. The company manages this trick by enabling users to encrypt message body parts and then require recipients to retrieve centrally stored, message-specific decryption keys every time they wish to open a message. With the company's product, destroying or retracting a message (or at least locking it away from prying eyes forever) is as simple as blocking recipients from accessing that message's decryption key.

Contrast this technology with the proprietary message-retraction feature in Novell's GroupWise. Novell's retraction functionality operates only up to the moment the recipient opens the message, works only across a network of GroupWise message servers and requires the message sender to actively delete the message on downstream GroupWise message servers. Disappearing's product lets senders retain indefinite control over their messages, operates potentially across any number of messaging systems that support digital certificates and requires recipients to actively request the public keys to open messages, even those received years ago.

I'm not sure whether I should be more amused or appalled by the new frontier of public-key-enabled message-retraction services.

What amuses me is how faddish and "late '90s" it all is. We're still trying to absorb the full impact of the Microsoft trial, in which damaging internal e-mails helped to convince a federal judge that the company has abused its de facto monopoly status in computer operating systems. Now every CEO in the world has begun to lose sleep worrying about legal liabilities lurking somewhere in the verbal foliage of their enterprises' voluminous message stores. Or in the millions of messages their employees have sent outside the company over the years.

With the millennium on our doorstep, we're turning a cultural corner into an era of enterprise paranoia centered on threats from Internet-facing e-mail systems. If we're not worrying about inbound beasties such as mail-borne viruses and spam-scams, we're agonizing over outbound disasters such as staff disclosure of trade secrets and other sensitive information.

What's appalling is the prospect of universal corporate deployment of message-retraction technologies. One casualty could be the concept of personal integrity and responsibility in business communications. It would be more difficult to hold someone to his word because each of us could withdraw our past words from the public record anytime we got the notion.

But I'm more amused than anything else by the upsurge in interest for message-retraction technologies. Enterprises have not rushed to embrace secure-mail products, and message retraction is not the killer app that will buoy this niche market. Even if message retraction were supported broadly by messaging vendors, users would probably ignore it much the same way they ignore the "priority" and "sensitivity" attributes supported in their current e-mail environments. Also, e-mail recipients would balk at the requirement that they download a noncacheable decryption key every time they want to open a message, considering this requirement would render offline message stores useless.

Besides, the growing interest in message-retraction technologies just points to the fact that many enterprises have not developed clear policies for aging, archiving and retaining e-mail messages. Companies may not want to let end users determine the appropriate time to live for e-mail messages that, after all, constitute a precious corporate record.

Clearly, message-retraction technologies open up a Pandora's inbox of troublesome issues for modern enterprises. This is not a technology that you should implement without thinking through the many cultural and legal ramifications.

Kobielus is an analyst with The Burton Group, an IT advisory service in Alexandria, Va. that provides in-depth technology analysis for network planners. He can be reached at (703) 924-6224 or jkobielus@tbg.com. The opinions expressed are his own.

SOME NETWORK CRASHES ARE MEASURED IN SECONDS. OTHERS, IN JOBS.

Any data network failure is bad. But if one should occur at a critical moment, you could be facing a meltdown of major proportions. That's why Ameritech networks are monitored around the clock by our Integrated Service Center—to help keep every one of your corporate interests safe. Visit www.ameritech.com/data or call 1-800-TEAM-DATA® ext.930 for more information.

Ameritech®

In a world of technology, people make the difference.

LAN/WAN ATM FRAME RELAY INTERNET SOLUTIONS SONET ISDN DIGITAL PRIVATE LINE VPN

VoIP

REALITY CHECK

Carriers, ISPs, .coms lead the way, while enterprises lag in voice-over-IP deployments.

BY SUSAN BREIDENBACH

John Chambers uses an IP telephone. So do the rest of Cisco's top executives. In fact, the company has deployed more than 2,000 IP phones in strategic locations like its New York sales office and executive briefing centers used by blue-chip customers.

But the fact that the people who put IP on the map can manage to run toll-quality voice over it doesn't mean that mere mortals can, too. A recent study by Faulkner Information Services indicates that only 7% of enterprises have deployed any voice over IP — generally as small, cautiously implemented pilot projects in least-critical environments.

And according to ICM Global Intelligence's 1999 Voice Over IP Report, the classic "hockey stick upramp" of new technology adoption won't really begin until around 2004.

"Enterprises face the biggest voice-over-IP challenges because of the intermix of a lot of different data structures and protocols in their campus and WAN environments, and because there is no one-stop shopping for voice-over-IP solutions," says Eric Larson, director of networking products for Motorola's Multiservice Networks Division in Mansfield, Mass.

Voice over IP may not be ready for prime time in corporate networks just yet, but it's getting there. And because most experts believe that voice over IP will become a widespread reality sooner or later, it may be time to get on the voice-over-IP learning curve with a pilot of your own — particularly if your company is highly distributed, has employees who move among offices a lot or has seasonally variable voice-service demands.

The early adopters

At this point, the main early adopters of voice over IP are carriers, which are being dragged into voice over IP — kicking and screaming in some cases — by newcomers such as Qwest, which have no circuit-switched infrastructure. The traditional carrier networks were set up to deliver services at 12 to 15 cents per minute, but in order to compete, they have to offer services at 5 cents per minute. Thus, most telcos can't make money without resorting to lower-cost voice over IP.

On the enterprise side, some multinational companies with far-flung subsidiaries are using voice over IP to avoid international long-distance charges. However, most early adopters have motivations other than cost savings. Nortel Networks and Lucent report that initial demand for IP PBXs is coming primarily from small, technologically advanced companies, such as Internet start-ups.

Take Minneapolis Internet start-up Flowers and Gifts, which was spun off earlier this year from a 50-year-old family business.

"Independent florists can't make it with the brick-and-mortar model anymore," says Lauren Christiansen, director of consumer member services for the company. "We decided upfront we would be an Internet-only company."

Instead of a traditional phone switch, Flowers and Gifts is using an IP PBX from Interactive Intelligence that runs on a Windows NT box and performs all PBX functions. The company outsources its e-commerce site and has no IT department, so the IP PBX had to be easy to administer. "I can do all the moves, adds and configuration changes, and I'm not a technical person," Christiansen says.

Currently, Flowers and Gifts has regular analog phones hanging off the IP PBX, and its employees interact with customers through Web-based text chat rather than voice over IP. There is downloadable software available that can turn customer computers into IP phones, but the company rejected this approach for the moment.

"I'm not seeing anything yet that is easy enough for our customers to use, and we also aren't sure how many of them have computers equipped with the necessary speakers and microphone," Christiansen says.

MPG/STEVE WOIT

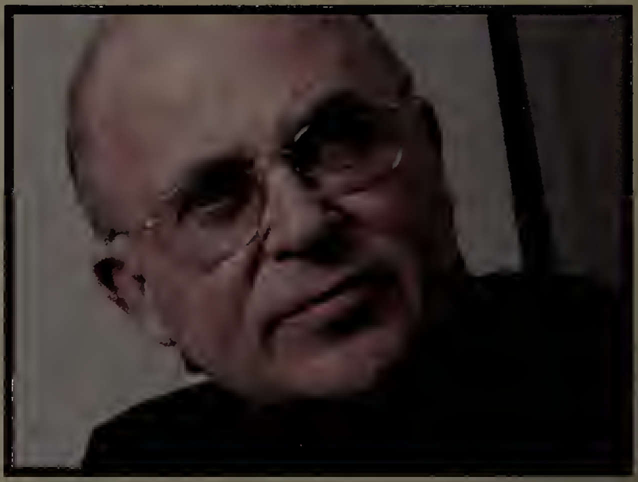
Lauren Christiansen, director of consumer member services for 'Net start-up Flowers and Gifts, chose IP PBX.

Internet start-ups are investing in IP telephony because of what it can do — now and in the future. Bigger, more mature enterprises need to be able to justify such an investment through total cost of ownership. But in hard dollar terms, today's IP PBXs may offer no cost advantage when compared to traditional voice costs, which are plummeting.

However, the issue of whether voice over IP in the enterprise can be cost-justified remains unresolved. Pallab Chatterjee, senior vice president and chief information officer at Texas Instruments, is determined to "build the case for voice over IP on hard dollars," adding that eventual soft dollar savings from

MPG/LEW WOLLAM

Pallab Chatterjee, senior vice president and CIO of Texas Instruments, is looking for hard dollar voice-over-IP savings.



MPG/SCOTT PARKER

Len Dorrian, vice president of information management and technology for CIGNA HealthCare, is using voice over IP for business flexibility.

applications such as unified messaging "are gravy."

Chatterjee has an easier time than most companies counting these costs because the telecom and data communications groups at Texas Instruments report to him. Voice over IP will be harder to implement in companies that keep the groups separate.

Chatterjee now has about 250 people on IP phones. This deployment is being increased to 1,000 by January as part of a pilot to see how scalable current voice over IP technology is.

"We have now done things like plug an IP phone into the corporate network in Singapore and get a dial tone from a PBX in Dallas," Chatterjee reports. "The network recognizes your phone number, so there are no moves, adds or changes to deal with."

In fact, voice over IP extends all remote-management capabilities of data to voice.

"In traditional voice systems, you can fix 40% to 50% of the problems remotely," says Larry Jones, vice president of enterprise integration services for Williams Communications Solutions in Houston. "On the data side, you can do 80%. Voice is still very people intensive, and people are the most expensive element of the network environment."

Still, many experts agree that early-adopter types are generally not focused on bottom-line communication costs. They are more concerned about the increasing pace of technological change and their abilities to accommodate new developments.

"In the end, what will force the change to voice over IP is the need for a flexible infrastructure," Motorola's Larson says. "Applications are a part of it — but only a part."

For example, CIGNA HealthCare sees voice over IP as a way to help cope with seasonal bursts of customer inquiries. Instead of staffing a central call center for these demand peaks, the company wants to be able to integrate groups at other locations in and out of the call center dynamically as the workload goes up and down. IP Exchange, Lucent's new IP PBX, made this possible, and CIGNA HealthCare served as one of its five initial beta testers.

In the initial trial, an IP PBX was installed at CIGNA's Bloomfield, Conn., campus and overflow 800 calls coming in to the Lucent G-3R PBX were switched to it. These calls then went to call center agents via Ethernet. Later in the trial, calls were routed over an IP WAN connection to IP phones used by remote agents in a southern New Jersey facility..

"Our business managers suddenly understand the reason for voice over IP when they see this," says Len Dorrian, vice president of information management and technology for CIGNA. "It isn't about cheaper phone service. We're after business flexibility. People are the most expensive asset we have, and we have to be able to use them more effectively."

At the end of the test, Dorrian pronounced the preproduction Lucent technology "not quite ready for prime time, but further along than we thought. The IP PBX had some system stability problems that three weeks of troubleshooting by Lucent engineers didn't resolve, and the voice quality on the PC-based softphones varied, according to Dorrian.

Still Dorrian is pressing ahead. "We expect to start deploying something in the latter part of 2000."

Reinventing the PBX

The first round of IP PBXs were the creation of 'Net heads, and as such didn't have much credibility with telecom managers. They also weren't built to scale beyond 100 to 200 users.

Lucent's just-released IP Exchange is the first IP PBX to come from a traditional manufacturer of voice-switching equipment. It supports up to 96 lines, but you can link multiple units together and manage them as a single system.

Nortel is responding with its Internet Communications Architecture, which is scheduled for release at the end of the first quarter of 2000. Nortel's first IP PBX will support up to 2,000 lines.

While no one is claiming the initial products can replace a 50,000-line Meridian switch, how high new IP PBXs can scale in multiple-unit configurations remains to be seen. However, they should ultimately be quite scalable.

"While a PBX is one physical box associated with a certain site, an IP PBX is not," says Christian Renaud, product marketing manager for Cisco's enterprise voice business unit in San Jose. "Instead, it's the Internet model — a lot of distributed devices acting as one system."

This distributed architecture conveys a number of advantages, including fault tolerance. When a corporate campus with 10,000 phones is served by five 2,000-line IP PBXs and one of them goes down, the remaining four can share the load. IP PBXs can also be distributed across the wide area, thus greatly simplifying the provisioning of telephony services throughout a company that has many small branches. The alternative would be to buy 30 separate key systems, then manage and support them individually.

Start-up Tundo Corp. in Boston is emphasizing this horizontal and distributed architecture by calling its first product a "distributed open telephony operating system" instead of an IP PBX. The initial iteration, being beta-tested in four call center environments, runs behind a Definity PBX and

Continued on page 58

SERVICE PROVIDERS DRIVE VOIP

Voice-over-IP implementation in the enterprise is lagging behind expectations partly because several factors — deregulation, economies of scope and scale, and the outsourcing trend — have shifted the momentum to the service provider market.

"Cisco and other companies are trying to persuade enterprises that voice over IP is the way to go on the campus, but there is hardly a groundswell of demand from users," says Tom Valovic, research manager at International Data Corp. in Framingham, Mass. The activity, the excitement and the sense of promise are all in the service provider market, in which providers and vendors are caught up in reinventing the public network.

"If enterprises are going to adopt voice over IP on a large scale, service-provider-driven applications will be the Trojan horse that leads to it," Valovic predicts.

This raises the question of whether companies shouldn't just outsource voice over IP altogether. With an IP Centrex approach, the legacy voice equipment on enterprise networks is no longer a stumbling block, and voice over IP can be introduced incrementally with very little risk and minimal disruption to users.

"Unified messaging is a tremendous [illegible] road warriors, who can pick up any kind of message at any time with any device," says [illegible] Cooper, CEO of FaxNet Corp. in Boston. "[illegible] a benefit that is going to be created in your own [illegible] through an IP PBX? I don't think so. [illegible] network — a service you buy."

Nokia Internet Communications in Mountain View, Calif., agrees and is packaging IP Centrex products for service providers.

"Big companies have a lot of little locations and some of them are using ISPs to provide standard data footprints as they upgrade offices or add new ones," says Dan MacDonald, vice president of marketing for Nokia Internet Communications. "So we say, 'Consider making voice part of that footprint.'"

Voice over IP enthusiasts also point to the speed of technological change, which is increasing the risk factor for big infrastructure deployments. If you have to start replacing facilities every two years instead of every five or 10, the total-cost-of-ownership argument for outsourcing becomes a lot more compelling.

— *Susan Breidenbach*

Zero

Number of data packets NuWave*Architecture* switches lost in independent tests.

NPI

The Stackable Gigabit Ethernet Company™

NETWORK PERIPHERALS INC.

1-800-674-8855

www.npix.com

QoS QUESTIONS

TCP is a very polite protocol, slowing down when it sees congestion. It is unsuited to voice, which has to be able to hog bandwidth and push its way through the crowd.

Out on the WAN, guaranteeing sufficient quality of service (QoS) for voice applications is still a problem in the public Internet, where service providers can't control the infrastructure from end to end. Some of the bigger players can constantly ping the network to check latency and choose paths accordingly, bumping some voice traffic over the public switched telephone network as needed. But we may never see ubiquitous toll-quality voice over the public Internet until the entire infrastructure has been upgraded to IPv6.

The "private Internet" is a very different matter because service providers can tune backbone networks and use various tricks of the trade to assure QoS levels.

On the LAN, enterprises have total end-to-end control and can throw more bandwidth at the problem. However, voice-over-IP implementations to date have been too small to really test the infrastructure.

"Today's technology basically supports 100-line-or-less environments, so you don't get into QoS issues," says Larry Jones, vice president of enterprise integration services for Williams Communications Solutions in Houston. "In larger networks, you have less bandwidth per user, and you are dealing with more management and change.

"Typically, it's been the third generation when you get the QoS you need. That was the frame relay and ATM experience. And while new IP PBXs that are coming out are being positioned as second-generation technology, they are really first-generation products, so we're probably looking at another 12 to 18 months."

Meanwhile, it's important to remember that voice, while it has to be up all the time, isn't a strategic application.

"What does giving all this QoS priority to time-sensitive applications like voice do to your mission-critical data applications?" asks Steve Johnson, vice president of marketing for MIL 3, a Washington-based company that provides simulation and decision-support software to developers and implementers of IP telephony. "Are you starving them?"

The bottom line is that you can probably solve most of the QoS problems on the LAN and WAN today, as long as the latter doesn't include the public Internet.

"Customers we've worked with who have implemented voice over IP are very happy with the quality when it's done," says Eric Larson, director of network products for Motorola's multiservice networks division in Mansfield, Mass. "But there is a lot of work to do before you get there. And, frankly, who has the time?"

— Susan Breidenbach

Continued from page 56

extends its capabilities to a second call center some distance away.

For example, Apac Customer Services, a teleservices outsourcing company in Deerfield, Ill., now has 300 agents working out of a second location 100 miles from its main call center and will increase that number to 1,500 over the next year.

"If you were to put in a second call center with its own PBX, it would cost you about $10,000 per seat — $5,000 for the computer and $5,000 for the telephony," says Gordon Payne, executive vice president of Tundo. "We provide the telephony portion by adding ports at $300 to $400 each to the existing Definity PBX, plus $600 per user in Tundo equipment at the host and remote sites. So that's about $1,000 per user vs. as much as $5,000."

Payne says call center managers make particularly good targets for voice-over-IP vendors because they are users who need something and who have a budget.

Installed-base inertia

The Tundo offering, which emerged in September, will eventually evolve into a standalone product that can provide full PBX functionality by itself. Meanwhile, it is designed to take advantage of Lucent's installed base of 100,000 or so IP-upgradable Definity switches.

Lucent and Nortel have their own upgrade products, and they have made it clear that their new IP PBX products notwithstanding, this upgrade approach is the path they expect and prefer their customers to take.

In fact, convergence enthusiasts say one of the biggest inhibitors to voice over IP is the billions of dollars carriers, vendors and enterprises have invested in circuit switching. Simply put, those investments are nowhere near recovered yet.

"Nortel and its channel make more money on the upkeep of existing PBX customers than they do on selling new switches, so they hardly want to walk away from the old infrastructure" says Larry Jones, vice president of enterprise integration services for Williams Communications Solutions in Houston. "That's why most of the people who are pushing convergence are on the IP side."

But the new carriers with the pure IP backbones can only push it so far. The local loops are still based on time-division multiplexing.

However, the pieces are coming together to make voice over IP a more viable option. For example, Time Warner Telecom in Denver is building local fiber networks that can provide businesses with an IP connection over the last mile, according to Tony Thakur, vice president of engineering, technologies and planning.

"That's what's been missing," he says. "You never used to hear of local customers needing OC-12s, and now they're asking for OC-48s."

Progress is also being made on the IP phone front, although the devices are still very expensive and don't interoperate across different IP PBX products. Prices should start dropping rapidly now that semiconductor companies have demonstrated highly integrated chipsets for IP phones. A year ago, phone manufacturers had to piece the different components together, which was very expensive.

Also, products are now available from third parties such as PowerDsine for sending enough electrical power over LAN cabling to keep IP phones running during power failures. This eliminates a major enterprise objection to voice over IP.

However, despite all the mergers and acquisitions and talk of technologies coming together, not even Cisco can give you all the end-to-end call management and other capabilities you need to replace your current voice infrastructure with voice over IP.

"I am a little frustrated with the hardware out there," says Sean O'Toole, operations director for Icarian, a Silicon Valley start-up. Icarian is using Interactive Intelligence's IP telephony platform to track phone transactions with customers and provide escalation procedures, but plans to use voice over IP for interoffice trunking and telecommuting applications are still on the drawing board.

"What I really need is the equivalent of a channel bank that lets me plug in some analog phones at the remote office and tie them back into the system at headquarters," O'Toole says. "I need a way to get from traditional analog equipment — switches or telephones — to IP and back at a reasonable density. There are a lot of products that give me 24 analog ports on both ends, but using up a whole T-1 for 24 analog lines is a real waste. I should be able to get 50 to 100 lines and still have room for a data connection. It's such an obvious product that I don't know why it doesn't exist."

Breidenbach is a freelance writer based in California. She can be reached at sbreide@aol.com

PREPARING FOR VoIP

QUICK PAYBACK. Don't let toll-bypass gains drive your strategy. If they are a tactical consideration, make sure the payback is quick. The variables in the equation are changing quickly.

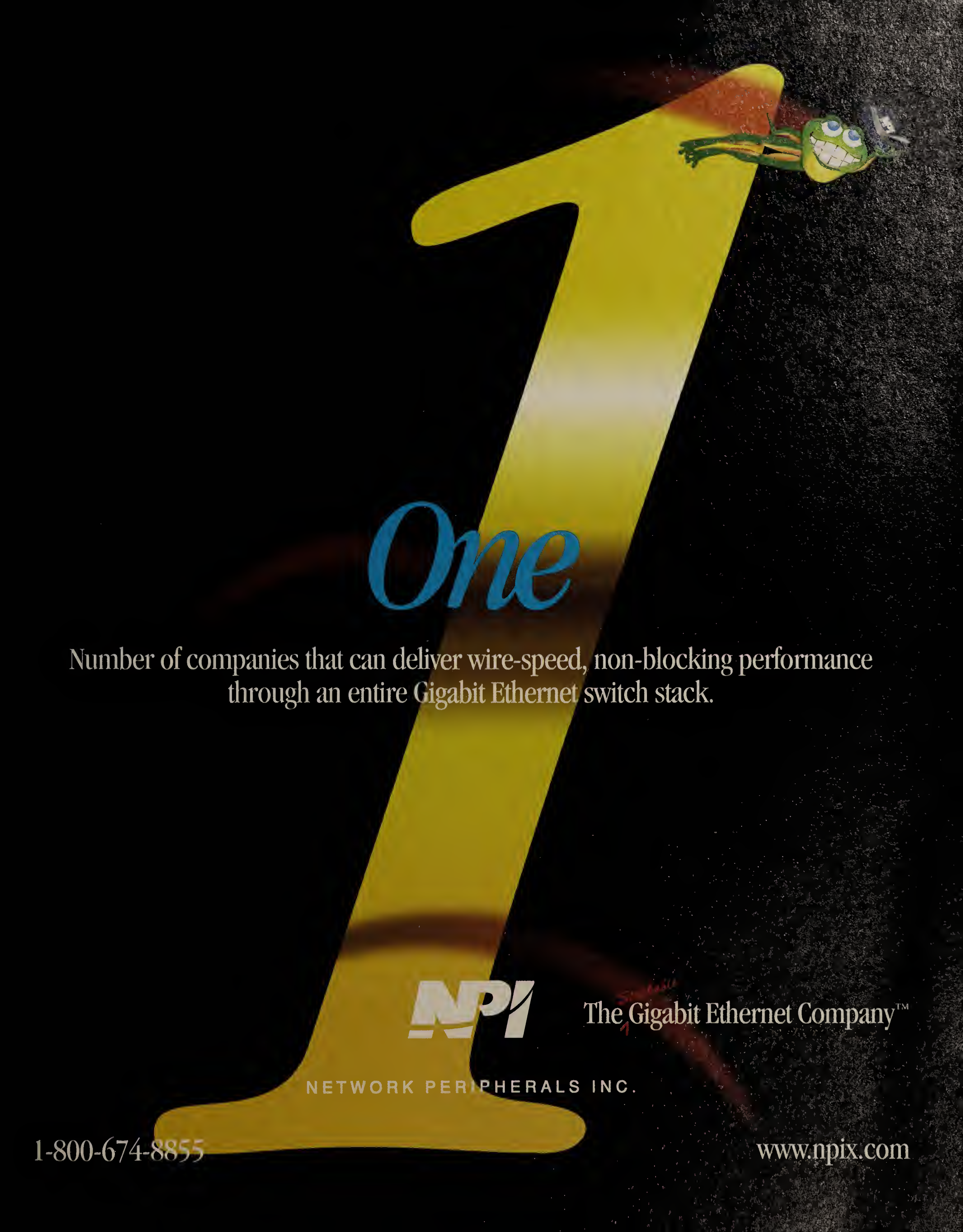
CONTRACTUAL CONSIDERATIONS. The pricing of carrier services is changing at an accelerating rate, so negotiate contracts that have flexible terms or are of short duration.

AIN'T NO SPARE BANDWIDTH. Beware of claims that your voice traffic will be compressed so much it won't require additional WAN bandwidth. Any excess WAN bandwidth you have will soon be used up by growing data traffic.

BACK TO SCHOOL. Send your data people to a class on voice networking. Behind the deceptively simple handsets are sophisticated voice applications and complex traffic management.

START SMALL. Take a cautious approach and start a small pilot in a noncritical area so you can see how voice over IP works and what kind of quality you can get with it. Look for solutions that let you preserve the infrastructure you already have.

THINK HORIZONTAL. Don't map the hierarchical structure of traditional circuit-switched voice onto voice over IP. You need to [illegible] IP's horizontal architecture.



One

Number of companies that can deliver wire-speed, non-blocking performance through an entire Gigabit Ethernet switch stack.

NPI

The Gigabit Ethernet Company™

NETWORK PERIPHERALS INC.

1-800-674-8855

www.npix.com

BUILD A GREAT SITE AND THEY WILL COME.

MAKE THEM WAIT EIGHT SECONDS AND THEY WILL LEAVE.

The carrier-class CS-800 supports 7 billion hits per day and scales to 1 million concurrent flows per Web switch.

Studies show that if Web users have to wait longer than 8 seconds for pages to download, chances are they're history. Conventional technology has focused on rocketing packets from A to B. But because Web traffic is unpredictable, event-driven, and conversational, managing it requires intelligence, as well as speed.

ArrowPoint's Content Smart™ Web Switch is the only Web switch designed specifically for the rigors of the next generation, e-business Internet. Only ArrowPoint's URL switching sends content *requests* to the best site and server based on real-time application and content availability – bringing an end to "Server Not Found." But we don't stop there, because only ArrowPoint also optimizes content *delivery* – 90% of today's Web traffic – using the best server located anywhere in your distributed network.

ArrowPoint Web switches eliminate aggravating waits and help your site keep its cool, even with flash crowds. They create sticky connections so shopping carts don't suddenly vanish. And they deliver big content flows like streaming media – fast.

ArrowPoint, the Web switching pioneer, is already on the job providing intelligence and performance with content smart Web services for some of the world's leading Web hosting, broadband and e-commerce companies. Check out our Web site to see what we can do for you.

ArrowPoint™
COMMUNCATIONS

When Web Performance is Your Business

www.arrowpoint.com

© 1999 ArrowPoint Communications, Inc.

PULLING THE PLUG ON ATM

NetReference recommends against new ATM in the LAN.

BY DAVE PASSMORE AND IRWIN LAZAR

It is not hard to see why keeping up with changes in technology is so important to network executives. No organization wants to sink millions of dollars into new network gear only to find that it could have deployed newer, better-performing, cheaper products. Or that it managed to overlook a much more flexible new technology or service that might do a better job of handling future applications.

That is where the network architecture planning process comes into play. Organizations need a way to track developments in network technology, and then understand how and where such developments may be applicable to their particular network infrastructures. One way to do this is through the development and maintenance of an enterprise network architecture, specifying what the network will look like two to three years out.

To assist enterprises in developing their own network infrastructures, NetReference, a consultancy in Sterling, Va., uses a "reference" network architecture (www.netreference.com). Based on a consistent framework of principles, technical positions and templates, the reference architecture provides a detailed description of what an ideal enterprise network should look like, along with supporting arguments and a basis for each technical position.

Here are the latest updates:

VAL MINA

ATM in the LAN

We have eliminated all recommendations to use ATM in LAN environments. This implies:

- No more new ATM building/campus backbones.
- No need to consider ATM LAN attachment — for example, network interface cards (NIC) — for servers or workstations. Instead, switched Fast/Gigabit Ethernet LANs are recommended.

Here's the rationale for the change:

First, ATM to the desktop never really took off, even with IBM's "low-cost" ATM25 variant; ATM switch and NIC costs have simply remained far too high relative to Ethernet and Fast Ethernet. Furthermore, IP-related LAN broadcast protocols such as Address Resolution Protocol require ATM desktops and servers to implement LAN Emulation — a form of virtual LAN.

LANE's complexity (for example, creating a broadcast environment out of a virtual circuit technology) didn't appeal to network administrators accustomed to Ethernet's simplicity. And ATM's Multi-Protocol over ATM routing (which builds on LANE) never appealed to administrators experienced with traditional routers.

The one place in the building/campus environment where ATM has achieved a measure of success is the backbone. Today, a substantial percentage of large enterprise sites have ATM backbones deployed — combined with Ethernet or token-ring desktop LANs. Much of the increase in ATM product revenue in the enterprise can be attributed to the growth of these pre-existing building/campus backbone LANs.

But in most cases, decisions to deploy most of these ATM backbones were made three to four years ago. Back then, ATM was viewed as a higher-performance alternative to FDDI rings. Fast Ethernet had just appeared, and Gigabit Ethernet was still off in the future. More importantly, Layer 3 switches (hardware Application Specific Integrated Circuit-based routers) were not yet available, so all LAN routers were still expensive, performance-limited, software-based products. Thus, "switch when you can, route when you must" was the rule, making switched, flat ATM backbones look attractive.

All that has changed recently with the availability of relatively inexpensive, wire-speed Layer 3 switches and Fast/Gigabit Ethernet trunks. With Layer 3 switches the rule is now, "route whenever it makes sense."

One of the often-touted attractions of ATM LANs is quality of service (QoS). However, unless an enterprise expects to run voice-over-IP or real-time (not streaming) video over its LANs, it is much easier and much less expensive to "throw bandwidth at the problem" and just add more LAN capacity. However, even if an organization is migrating to voice over IP (for example, replacing PBXs and adding Ethernet phones), ATM is still not required. All that is needed for LAN QoS is simple prioritization of Ethernet traffic. ATM's QoS is overkill for LANs.

Unless an enterprise has already invested in an ATM building/campus backbone (and a net manager doesn't want to explain to management why it should be replaced), the preference is to avoid ATM and implement Ethernet backbones instead. Thus, for new LAN/campus installations, ATM is not recommended.

Building wiring

We recommend Enhanced Category 5 (Cat 5E) for building wiring. As a standard, Cat 5E is rated at the same 100-MHz bandwidth as Cat 5, but other parameters have been strengthened to improve performance. Specifically, the return loss and equal level far-end cross-talk parameters have been increased. This specification ensures compliance with high-speed Ethernet, particularly the new Gigabit Ethernet over copper (1000-BaseT) standard.

While 1000-BaseT is designed for Cat5, poor installations and below-grade wire may cause problems in many existing cable plants. By installing at Cat 5E, enterprises can be sure that their wiring plants can fully support 1000-BaseT.

Passmore is founder and research director of NetReference in Sterling, Va. He can be reached at dpassmore@netreference.com. Lazar is an analyst with NetReference specializing in desktop and IP management issues. He can be reached at ilazar@netreference.com.

www.nwfusion.com

TALKING WITH
DAVE

Should users pull the plug on ATM in the LAN? Head online to debate the topic with Dave Passmore in our forum.

DocFinder 5621
find it online

Presenting the ideal integrated firewall, VPN and traffic shaping solution.
The dream was to come up with a suite of integrated security products offering record-breaking wire-speed performance, scalability and manageability. The dream is now a reality. NetScreen has developed a powerful architecture and custom ASIC design that integrates critical firewall, VPN and traffic shaping functionality. NetScreen's vision was to deliver the simplest, most effective solution ever deployed. Which means, total Internet security is not just a dream. It's actually here.

NETSCREEN
Integrating Security and Performance

1-877-NETSCREEN
www.netscreen.com

©1999 NetScreen Technologies, Inc. All Rights Reserved.

NetworkWorld REVIEW

Streaming video servers

Getting the Little Picture

Real Network's RealSystem G2 serves up the best streaming video, but is it worth a thousand words?

BY BARRY NANCE

Instead of herding groups of employees into your company's audiovisual department for training, marketing presentations and enterprise-wide speeches, why not deliver the same video content directly to their computers and save thousands of hours of lost productivity? Video server software claims to provide a direct video link between an information source in your company and the desktops of the many employees who need that information. But is the image quality good enough? Will the video stream bring your network to its knees? Does the product support common video standards? Will it work with the computers you already have?

We invited vendors to submit video server software tools you can use to create (or import), edit and distribute streaming video images. The software could be part of a bundled hardware platform or run on a standard server operating system.

We found RealSystem G2, made by RealNetworks, to be the best product for serving up video across a digital network. It gave us nearly everything we wanted: high-quality images, good performance, support for several standards, platform neutrality and easy management. It's also the only product we tested that runs on a Unix platform, though we tested the version that runs on Windows NT. Unfortunately, RealSystem G2 is more expensive than the other products we reviewed.

Apple's QuickTime 4 was no slouch either, but it required a Mac G3 server, which Apple sent us. Microsoft's Windows Media Technologies, bundled with Windows NT Server, worked well in light use with no special security requirements.

InfoValue Computing's QuickVideo Suite, we concluded, is best used for specific vertical market applications, such as corporate training centers, in which general-purpose video streaming isn't a factor. The suite consists of four products: QuickVideo on Demand, a TCP/IP-based video stream server; QuickVideo Multicast, an IP Multicast video server; QuickVideo Archive, a video file organizing tool; and QuickVideo IntraWeb, a browser-based image displayer with caching aids.

RealNetwork's
RealSystem G2
RealSystem G2 wins our Blue Ribbon for its high performance and top-notch tools.

Video server software works best with fast network connections. Even with fast client computers to handle the decompression of the video frames, viewing video streams through 28.8K or 33.6K bit/sec modems was somewhat frustrating. All the players left visible artifacts, such as colored squares and stray jagged lines, as well as image residue on the screen at slower modem speeds, and they often dropped considerable detail from the displayed image.

All the streaming video server software products hogged the server CPU, continuously pegging CPU utilization at 100% as they distributed video images over the network. Don't count on using the video server for other purposes, such as Web or file serving.

Managing the broadcast studio

During our initial testing, we immediately noticed these products were designed to work best on IP networks. The products' codecs (see story, page 65) made use of IP's connectionless User Datagram Protocol (UDP) to avoid the transport layer's packet monitoring and

ScoreCard

	Performance 30%	Editing tools 25%	Administration 25%	Installation 10%	Documentation 10%	Total score
RealSystem G2	9	9	9	7	7	8.60
QuickTime	6	7	8	6	7	6.85
Windows Media Technologies 4	6	7	7	6	7	6.60
QuickVideo Suite	8	4	4	6	8	5.80

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

NetResults

RealSystem G2
RealNetworks
(800) 444-8011
www.real.com

Pricing starts at **$5,995** for 100 concurrent users

Pros
- High-quality image display
- Remote administration
- Good performance

Cons
- High price

QuickTime 4
Apple Computer
(800) 538-9696, (408) 229-0555
www.apple.com/quicktime

$30 for Pro version (includes video editing tools)

Pros
- Good video editing tools
- Comes with several video codecs

Cons
- Inadequate security
- High bandwidth utilization

Windows Media Technologies 4
Microsoft
(800) 426-9400, (425) 882-8080
www.microsoft.com/windows/windowsmedia/en

Included in the cost of Microsoft Windows NT Server 4.0

Pros
- Works well in light-duty situations
- Media Player uses the CPU frugally

Cons
- Slow performance
- Remote admin required IE 4.01 and an ActiveX control

QuickVideo Suite
InfoValue Computing
(914) 345-5996
www.infovalue.com

$4,000 plus **$350** per user

Pros
- Good performance
- Highly customizable

Cons
- Developer-oriented
- Lacks good video editing tools
- MPEG-2 requires special client hardware
- Most expensive, when cost of client software considered

error correction via retransmission.

Our tests showed RealSystem G2 and QuickVideo Suite to be the fastest servers of video streams across the greatest range of servers and network contention situations. Moreover, the RealSystem G2 codecs impressed us by working well over Ethernet, T-1, DSU/CSU and 56K bit/sec modem connections. In one test, RealSystem G2 was able to display excellent-quality video at 30 frames per second (fps) on high bit-rate content.

QuickTime 4 performed well until we attempted to increase the frame rate to greater than 15 fps. Past that level network traffic began increasing at a high rate, saturating the clients. Windows Media Technologies performed well at slow frame rates on a lightly loaded network. When we asked it to broadcast high-rate video images under adverse network congestion conditions, Windows Media Technologies bogged down severely or ground to a screeching halt. Similarly, QuickTime 4 reacted badly to adverse network congestion, but RealSystems G2 and QuickVideo Suite continued to serve up video, albeit in a degraded fashion.

We found several differences in these products' content creation, editing and administrative features. RealProducer Pro, RealSystem G2's timeline-based video editor component, is a superior tool for editing and managing video streams. Not only did it offer features such as Frame Rate Upsampling, which produced high-quality video even when subjects were moving fairly rapidly or the camera was panning, RealSystem G2 also gave us remote administration via a browser-based interface.

Frame Rate Upsampling uses temporal interpolation to estimate movement between key frames and thus encode and show a smoother, higher-quality image. In our tests, Frame Rate Upsampling actually increased client frame rate. The clients' frame rates suffered dramatically with the other products when we attempted to broadcast images of quickly moving subjects. In one test, we encoded and transmitted a 5-fps stream that clients displayed at nearly 15 fps.

QuickTime 4 Pro, which is QuickTime 4 plus some editing tools, was almost as easy to use and feature-rich as RealSystem G2. Its QuickTime Player module was especially good at embossing, sharpening and tinting the images during an editing session. Both RealSystem G2 and QuickTime 4 Pro did a professional-looking, painless job of annotating image streams with text. Just a few clicks of the mouse let us select fonts, colors and attributes such as smooth scrolling.

Windows Media Technologies' and QuickVideo Suite's video editing tools were unremarkable.

Administration and security

We also found some differences in the products' administration tools. We found RealSystem G2's Java-based remote administration client highly useful. With it, we were able to start and stop the video server, manage all the concurrent audio and video streams, and configure user authentication. QuickTime 4 and QuickVideo Suite don't offer a remote management feature. Windows Media Technologies' remote administration feature gave us less control than RealSystem G2's and required that we use the Internet Explorer browser as well as install an ActiveX component alongside the browser. With its simplistic interface, Windows Media Technologies was easy to administer but didn't offer the breadth of control options we would've liked.

For security, RealSystem G2 employs a user ID and password challenge scheme to identify clients, and it let us set up different viewing authorizations based on directory permissions and various time limits. For example, we easily allotted users access to only certain video streams and limited the length of time a user could view a stream. At our behest, it also encrypted the video streams.

www.nwfusion.com

REACHING INTO REAL TIME

How-to: Learn how to create streaming media.

Downloads: Software to help you get started in real-time media.

DocFinder
find it 5721 online

Video servers at a glance

	RealSystem G2	QuickTime 4	Windows Media Technologies 4	QuickVideo Suite
Server platforms				
Windows NT Server	✓	—	—	✓
Macintosh System 8	—	✓	✓	—
Unix	✓	—	—	—
Client platforms				
Windows 95/98/NT	✓	✓	✓	✓
Macintosh System 8	✓	✓	✓	✓
Video codecs	H.261, MPEG 1, MPEG 2	MPEG 1 Layer 3 (MP3), Sorenson Video, H.261, H.263	MPEG 4	MPEG 1, MPEG 2
Video and audio file formats supported	ASF, AVI, MPEG 1, QuickTime, Vivo, WAV	AIFF/AIFC, AVI, MIDI, FLC, QuickTime, WAV	ASF, WAV, AVI, MPEG, MIDI, VOD, AU, MP3, ID3	MPEG 1, MPEG 2, DVD, Motion JPEG, AVI, Quick Time, Cinepak, Indeo
Remote administration	✓	—	✓	—
IP Multicast support	✓	✓	✓	✓
Back-channel IP Multicast for security and playback monitoring	✓			
Security				
User authentication	✓	—	✓*	✓*
Confidential content	✓	—	✓*	✓*
Stream encryption	✓	—	✓**	—
Time-limited viewing	✓	—	—	—

*Relies on Windows NT's internal security and access control list features.
**Protects video images from theft.

QuickTime 4 lacked security features, while Windows Media Technologies and QuickVideo Suite simply took advantage of whatever underlying NT Server permissions and access control lists we set up. Windows Media Technologies did not even support HTTP digest, a rudimentary but better-than-nothing means of safely transmitting passwords over the Internet. To its credit, Windows Media Technologies comes with a Media Rights Manager that controls the user's ability to make copies of the video stream.

All four products support IP Multicast, a network addressing scheme for sending a single stream of packets to selected, multiple clients. We used the feature to target groups of IP clients with a single broadcast of video material, thus conserving bandwidth. We could even configure RealSystem G2 to use a "back channel" with IP Multicast, which authenticated Multicast clients and let clients ask the server for retransmissions of dropped frames. The result was a higher-quality but slower display in a noisy or highly congested network environment.

Getting on the air

Getting each of the streaming video products up and running involved the installation of both client and server software, meaning we had to visit and configure each client computer before it could receive video input. Configuration consisted mainly of selecting combinations of audio and video compression schemes that matched the type of video stream we were using and the bandwidth of that network segment.

RealSystems includes a wizard module that helps match the type of audio and video for a particular situation (images of people's heads and sounds of voices, for example) with the appropriate codecs. Windows Media Technologies has a similar wizard. Windows Media Technologies also offers more templates (such as "high-motion scalable video" and "presentation scalable video") for varying amounts of bandwidth and different types of video and audio streams than RealSystem G2. However, the extra templates and corresponding number of wizard questions made the administrator's job more complex without significantly improving the viewing experience or reducing network bandwidth. Alternately, you can configure a Windows Media Technologies stream by manually choosing a target bandwidth and codec. QuickTime 4 and QuickVideo Suite didn't offer wizard-based guidance in the configuration of codecs.

With its suite, InfoValue sent us a license-enforcement parallel port dongle that limited concurrent users to 100 and streamed video to 500M bit/sec. We always find dongles an annoyance.

Using these video server software tools is a practical, cost-effective alternative to sending large groups to big-screen audiovisual corporate events. However, streaming video can consume considerable network bandwidth and the image quality is unacceptable when they're used with slow dial-up connections.

Get RealSystem G2 if you make more than occasional use of your company's audiovisual department for video presentations. Microsoft-centric shops with lightly loaded networks and an infrequent need to show video to employees will appreciate the fact that NT Server comes with video server software, and Mac-centric companies will similarly appreciate QuickTime 4's low cost. QuickVideo Suite might be appropriate for an audiovisual department that happens to have its own programming staff.

Nance, a software developer and consultant for 29 years, is the author of Introduction to Networking, 4th Edition *(Que, 1997) and* Client/Server LAN Programming *(Que, 1994). He can be reached at barryn@erols.com.*

How we did it

To put these four video server software products through their paces, we simulated the operation of a corporate communications center charged with the job of offering a variety of networked video streams to a company's employees. We served up prerecorded "talking head" images (what a human resources department or training center might originate), animated product specification content (what a marketing department might originate), and a small amount of real-time videoconferencing material from digital video cameras.

Our test network comprised an IP-based central Fast Ethernet LAN and two remote sites connected via T-1 links. Our streaming video servers were a 450-MHz Macintosh G3 and from one to three 400-MHz Pentium III servers broadcasting the video images to 32 clients. The Pentium machines ran Windows NT Server 4.0 with Service Pack 5, while the clients ran a mixture of Windows 95, 98, NT and Macintosh System 8 operating systems.

During each test we edited, stored, managed and transmitted video streams to the clients. To evaluate performance, we recorded CPU utilization on the server and client, noted network utilization as measured by Network Associates' Sniffer protocol analyzer software, running on a Dolch PAC 63C, and timed the clients' response times during playback.

We also used the Sniffer to cause controlled degrees of network congestion. To put an extra load on the network during some of the video server tests, we instructed the Sniffer to emit streams of 500-, 1,000- or 1,500-byte blank packets and increased the workload each 60 seconds.

In judging the products we looked for multiple video file format standards support, image size and quality, host and client performance, low network bandwidth utilization (including support for IP Multicast), editing and annotation features, ease of use and documentation.

ScoreCard

	Image quality 40%	Interface 30%	Features 15%	Formats supported 15%	Total score
RealPlayer G2	9	9	8	8	8.70
QuickTime 4	7	7	7	8	7.15
Windows Media Player 4	7	7	7	5	6.70
QuickVideo Suite	7	4	6	5	5.70

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

THE VIEWING EXPERIENCE

Vendors clients mirror server strengths.

These products' clients are as different as the servers. Because you can use any multimedia client to view video produced by any of the servers we looked at, as long as the client supports the video format used, the choice of client comes down to individual preference. Therefore, we rated each product's bundled client separately.

RealPlayer G2, the client side of RealSystem G2, contributed substantially to RealNetworks emerging as the winner in this review. We liked its RealChannel feature, which let us build one-click lists of streamed video programs from which we could select. It also dynamically updated and displayed headline text from each channel. We used RealPlayer G2's 10-band graphic equalizer to fine-tune its audio playback qualities and its video controls to adjust contrast, brightness and color saturation. From a network administration perspective, we appreciated RealPlayer G2's ability to update itself to a later version with no intervention on the part of the user. Like QuickTime 4's Web browser plug-in module, RealPlayer G2 was smart enough to begin displaying the video stream the moment the first few frames reached the client.

When used with Netscape's browser, the QuickTime 4 plug-in module did an amazing job of detecting client CPU processor speed differences and automatically adjusting the display quality accordingly. However, this feature didn't appear to work in the Microsoft Internet Explorer environment. Using different CPU speed client computers with Internet Explorer produced no noticeable effect on the stream's display. In a test in which multiple bit-rate versions of the same video stream were made available through QuickTime 4, the QuickTime 4 plug-in was able to select the appropriate version of a QuickTime movie based on the client's connection speed. Windows Media Player was also able to select connection-appropriate streams.

Windows Media Player, Microsoft's video client, exhibited the least CPU utilization during our tests but offered the worst user interface. For instance, choosing a video stream with Media Player took several more mouse clicks than with RealPlayer G2.

The QuickVideo Suite is unique in its ability to stream any format of video to just about any player. Unfortunately, the InfoValue suite is highly developer-oriented. Essentially a software developer's kit, your programmers might use it to custom-build an application-specific video display system for a particular corporate purpose.

IT TAKES AN EXTRAORDINARY
SWITCH TO CHANGE THE BUYING
PATTERNS OF MOST COMPANIES.

Yours is no ordinary business, and the Summit7i™ is no ordinary switch. It combines the benefits of a stackable with the performance and density of a chassis - 32 Gigabit ports, 64 Gbps capacity and 48 million pps throughput. Which ensures wire-speed performance and resiliency for co-located servers. Plus prioritization and bandwidth control for ERP and e-commerce traffic. And it runs on existing Category 5 twisted-pair cabling. But the most astonishing thing about Summit7i is the incredibly low price per port. It'll do more than just turn a few heads. For more information, call us or visit our web site.

extreme networks

www.extremenetworks.com/ad/seven.htm
888-257-3000, ext. 3131 (U.S.)
+1 408-579-3131 (Outside U.S.)

©1999 Extreme Networks. All rights reserved. Extreme Networks is a registered trademark, and the Extreme Networks logo and Summit7i are trademarks of Extreme Networks. All other company names or products are trademarks or registered trademarks of their respective companies.

Hands-on learning

Online training programs let students tinker with real network equipment.

BY DAVID RATHS

Francis Saucedo is studying to become a Cisco Certified Network Associate (CCNA). He has tried simulated courseware, but he prefers to learn on real equipment.

"Just having live routers to bang on is the most important thing," says Saucedo, a systems engineer for Sprint in Chicago.

Naturally, Sprint can't afford to have him practice in a production environment and bring the network down. So to access routers, Saucedo turned to an online course at CyberState University (CSU) of Lafayette, Calif. CSU and MentorLabs of Annapolis, Md., are two of only a handful of companies that make access to live equipment a focus of distance-learning courses.

Organizations don't want to hire people who can pass a test but who have no hands-on experience. "Companies don't hire people for their knowledge but for their skills," says David James Clarke IV, a network instructor at CSU.

Greg Long, vice president and general manager of MentorLabs, agrees that simulations aren't the best way to learn. "Simulations are programmed and are limited to what the author thinks is the best way to solve a problem," he says. "What you're learning about is the author's mindset." Access to real equipment lends an unpredictability that simulations can't provide, he adds.

Chuck Diltz, a network consultant in New York, recently passed his Cisco Certified Internetwork Expert exam after taking a MentorLabs course. "The exam is all-encompassing, and it's difficult to gain experience with all the network protocols and features in your job," he says. "With MentorLabs, I was able to get hands-on practice in areas I was weakest."

MentorLabs launched its Cisco-focused site last May and now has approximately 10,000 registered users. Its vLab is available in two versions: Online and Enterprise. Online is hosted over the Internet and costs between $65 to $125 per lab. Enterprise is installed at the customer site and provides unlimited access to all the labs for an annual fee.

CSU uses proprietary technology to provide real-time access to a global enterprise network over the Internet and integrates the labs into its network courses. Full certification programs range in price from $1,795 for Cisco CCNA to $3,495 for Microsoft Certified Systems Engineer.

CSU instructor Clarke sets up a hypothetical corporation for his classes, then builds live labs around the company's networks. Students spend 150 hours completing 50 different labs focused on designing, building, configuring and troubleshooting the networks.

Long and Clarke say employers are starting to see the value inherent in their brand of discovery-based learning because companies end up with better-trained and more valuable employees.

Long says one company recently placed vLab in a head-to-head competition against more traditional computer-based training. One group used vLab and a CCNA study guide, while another group with comparably skilled network engineers used the same manual and 12 off-the-shelf computer-based training lessons. After 10 days and the same amount of time dedicated to CCNA-track learning, everyone in the vLab group passed the exam, while the members of the computer-based training group all failed, Long says.

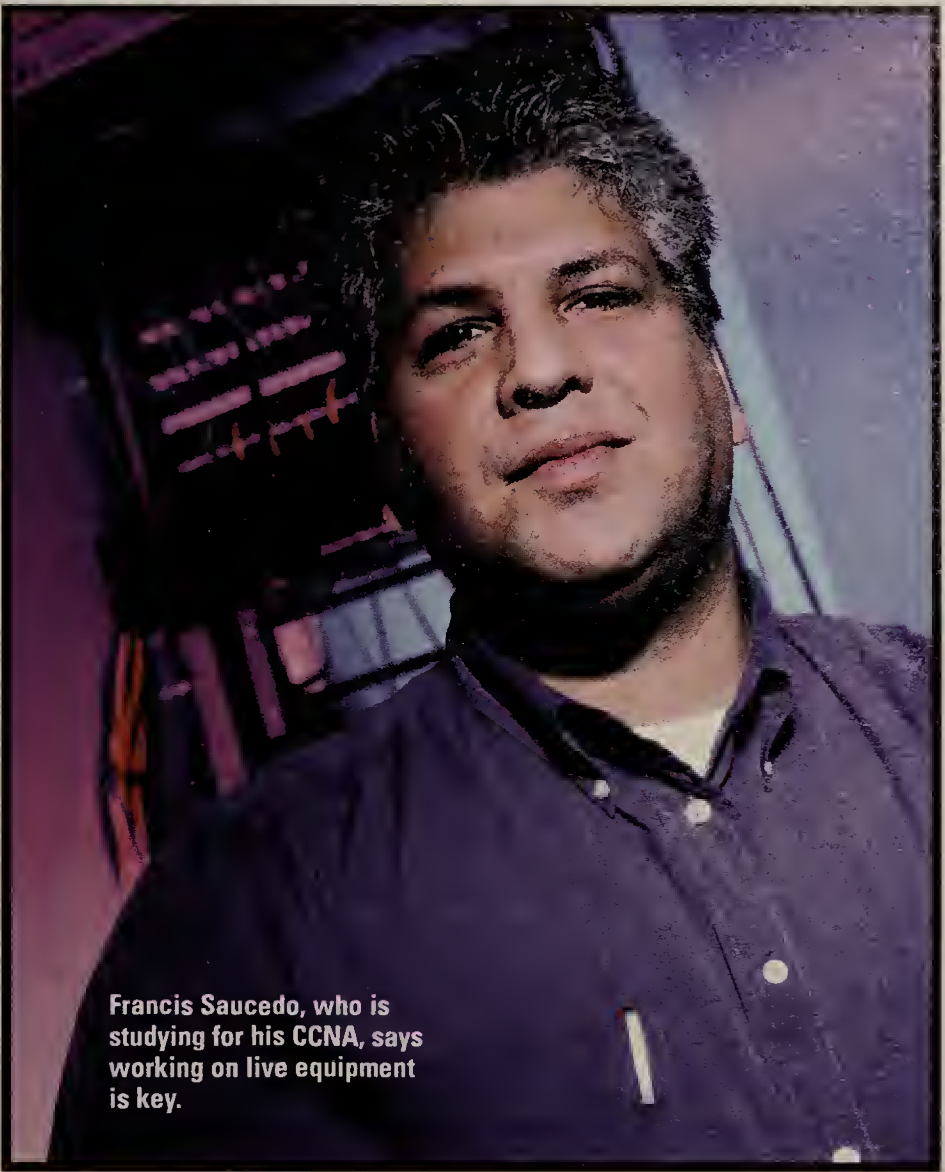
Greg Oetker, president of simulation training developer PC Technology, agrees that many computer-based training programs are "canned" products that don't offer a real value to the students. However, he claims his simulations are less expensive than online labs and offer many of the same features.

For example, his product lets students create multiple users and groups. "Because we offer a true simulator, the students can learn while receiving real error messages as if they were using the real products," he says. PC Technology's products cost $25 to $100 per simulation.

Students Diltz and Saucedo say the flexibility to practice on routers whenever it's convenient for them is one of the biggest advantages of the live lab approach. Traditional five-day courses are too difficult for Saucedo to cram into his work schedule.

Moreover, Saucedo likes the ability to check his progress with CSU's program. He repeatedly took an assessment exam that came with the course. At first, his scores were "pretty dismal," but he has since seen some encouraging improvements.

Raths is a freelance writer in Kailua, Hawaii. He can be reached at draths@lava.net.



Francis Saucedo, who is studying for his CCNA, says working on live equipment is key.

ALAN KLEHR/MPG

www.nwfusion.com

LEARNING LINKS

Freebie: Register for an introductory lab from MentorLabs.

Help Desk: Cisco router training recommendations.

DocFinder 5722 find it online

WHERE VIRTUAL BECOMES A REALITY

A leader in the ever-changing communications marketplace, we're it, we're happening. We stand at the forefront of some of the most advanced ISP technological innovations, developing connectivity at terabit speed. Our data-driven, integrated communication services include Internet, IP and long distance/local telephone networks — helping make the world one neighborhood. Now that's cool — seriously.

Now's your chance to be part of our success story. **Positions available in Rochester, NY.**

SENIOR DATA ENGINEER

In this challenging position, your responsibilities will include establishing/maintaining data network architecture with the ability to deploy national Frame Relay/ATM infrastructure. You will also test network devices, design new products and services, and develop engineering standards.

To qualify, you should possess 5 years' diverse data communications engineering experience that includes LAN/Management protocols, signaling, Ethernet, Token Ring, and H991. Knowledge of circuits, network analyzers, DOS, Windows, and UNIX/SUN Solaris is necessary. Excellent communication/project management skills are required; international network design/implementation and voice over IP design/implementation are desired.

OSPE PROJECT MANAGER

In this position, you will assist in the outside plant engineering design and construction of national fiber optic network. You will be responsible for monitoring the daily activities of construction contractors, participating in weekly construction meetings, updating construction schedules, preparing various weekly reports, participating in the audit of Construction Inspection Program, and preparing contract documents for design engineering.

Qualified candidates must have a solid engineering/construction background working on long-distance fiber optic cable projects. Experience with fiber optic cable design and construction along railroad, private, and public right-of-way, as well as intra-building conduit and cable placement is necessary. Knowledge of procurement franchises and license agreements, as well as engineering/construction practices for aerial, direct buried and underground fiber optic cable is necessary. Working knowledge of MS Office (Word, Excel, PowerPoint), Visio, and CAD is required.

PLATFORM MANAGER

You will interface with Product Management and Engineering in order to keep track of capacities and network builds, ensure that software revisions are uniformly applied, and keep updated with new product enhancements and features. You will also interface with vendors for existing products, and provide feedback to Product Managers on new developments both internally and externally. To qualify, you should have 3+ years' strong engineering/technical background, along with excellent interpersonal skills. A BS/BA in management or a technical field is required.

CUSTOMER NETWORK MANAGER

You will be responsible for Customer Network reporting to external customers on key SLA (Service Level Agreements) & performance parameters, as well as ensuring that key internal metrics are gathered, analyzed and presented. Other duties include acting as database manager for the CNM product, interfacing with Product Development, Product Managers, Sales Client Services and vendors, and developing a software platform to gather statistics on IP, DSL & managed services similar to the CNM product for Frame Relay & ATM. You will also manage the migration from legacy management tools to the CNM product. You should be a process-oriented self-starter with a strong software background. Excellent quantitative and analytical skills are essential.

Frontier offers a comprehensive benefits package.

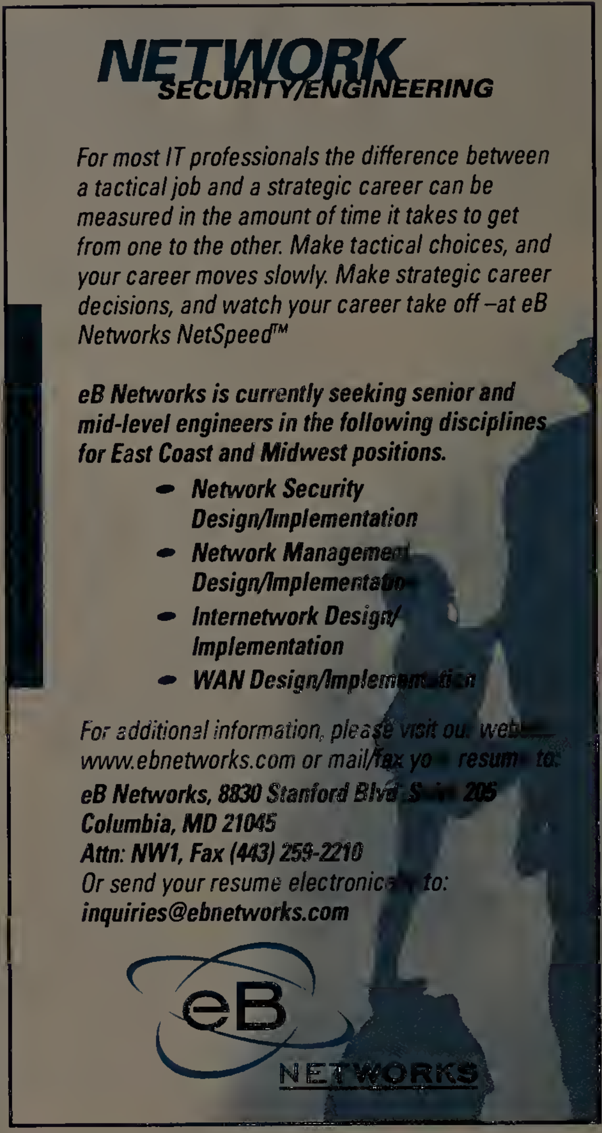
If your curiosity has been piqued, please send resume to: Corporate Staffing-ML, Frontier Communications, 180 S. Clinton Avenue, Rochester, NY 14646 or fax: (716) 232-1045, Attn: ML or e-mail: maggie_lohkamp@frontiercorp.com

frontier℠
COMMUNICATIONS
www.frontiercorp.com

Make Things Click.

©1999 Frontier Corporation.
Frontier Communications is a service mark of Frontier Corporation.

EOE.



NETWORK
SECURITY/ENGINEERING

For most IT professionals the difference between a tactical job and a strategic career can be measured in the amount of time it takes to get from one to the other. Make tactical choices, and your career moves slowly. Make strategic career decisions, and watch your career take off –at eB Networks NetSpeed™

eB Networks is currently seeking senior and mid-level engineers in the following disciplines for East Coast and Midwest positions.

- ***Network Security Design/Implementation***
- ***Network Management Design/Implementation***
- ***Internetwork Design/ Implementation***
- ***WAN Design/Implementation***

For additional information, please visit our website www.ebnetworks.com or mail/fax your resume to:
eB Networks, 8830 Stanford Blvd. Suite 205
Columbia, MD 21045
Attn: NW1, Fax (443) 259-2210
Or send your resume electronically to:
inquiries@ebnetworks.com

eB NETWORKS

GOT HIRING NEEDS?

Talk To NetworkWorld 508-879-0700 x6304

Over 1 Million Readers, Viewers, Attendees

Online Advertising Options

Highly Specialized Career Fairs

508-879-0700 x6304
Recruitment Advertising

HIGHLIGHTS

Dec 6 - Ad Close: Nov 24
Buyer's Guide:
Ethernet backbone switches.

Distribution at
DCI's eBusiness World,
Chicago.

Dec 13 - Ad Close: Dec 1
LDAP servers review.

Special Focus:
Carriers & ISPs.

Dec 20 - Ad Close: Dec 8
The secrets of the
tariff game.

Talk To Network World

Company involved in Wireless Communication Services is seeking to fill the position of Financial Analyst to be responsible for research & analysis of market conditions to determine demand for co. services & potential sales & revenues; analyze data to prepare forecast economic conditions; review & compare competitor business activities & financial revenues; create financial reports by gathering & interpreting data from various sources, & organize findings utilizing computer generated charts & graphs; communicate with Korean-owned customers in the U.S. & Korea, conversing in the Korean language & prepare financial reports in English & Korean for benefit of Korean customers & co. personnel in the U.S. Qualified candidate should have a Bachelor or equiv in Financial Management, Marketing, Int'l Business or Business Admin & 2 yrs. relevant exp. Marketing, Int'l Business or Business Admin. & 2 yrs. irrelevant exp. Excellent salary & benefits pkg. Send resume to President, PCH Communications, Inc., 3772 Pleasantdale Rd. #110, Doraville, GA 30340.

Software Engineer to design, develop, test and implement software applications in client server environment using Visual Studio (Visual C++, VB, JAVA, Interdev), C++, C, Oracle, SQL Server, Access, Windows SDK and Unix shell scripts; create software modules in VISUAL BASIC and C++ using COM, DCOM, Automation, OLE and ActiveX; Develop applications based on three tier client server architecture using Visual C++ on WindowsNT workstation and NT Server; design and develop Datawarehouse applications; design and develop web pages using HTML, Java, ISAPI,ASP,CGI and VB Script; perform testing of remote execution of components using Remote Automation, DCOM and TCP/IP protocols. Require MS or foreign equivalent in Computer Science, Computer Application or Computer Information Systems Salary: $62,000 to $72,000/yr, 40 hrs/wk. 70% travel involved. Send resume to WAVESOFT, Inc., 4680 Weathervane Drive, Alpharetta, GA 30202. Must have proof of legal authority to work permanently in the U.S.

Romac International has a need for an experienced Sr. Systems Engineer to research and develop state of the art applications with the following skill: Informix Online, Informix 4GL, Informix ESQL/C, Impromptu, Oracle Financials, Powerbuilder, Information Engineering Workbench, WinNT, Pro*C, PDP-11, Unix Natual 2, and SQL Report Writer. M.S. Comp. Sc. Or Comp. Engg., with min. 2 yrs. Exp. Reply to jpaske@romac.com or fax to 770-351-4919.

For More Information About Advertising in Network Careers

1-800-622-1108

Information Systems Consultant: Design, develop, test, implement, and maintain modules of a large Customer Billing System (CABS) and a National Order Information System (NORDIC) using mainframe tools such as COBOL, COBOL II, IMS DB/DC, DB2, XPEDITER, PLATINUM, FileAid, and DBMS functions; solve and determine the cause of Production IRs (Incident Requests). Bachelor's degree in C.S. req'd as is 2 yrs of experience as a programmer. Prior experience must include experience with COBOL, IMS DB/DC, DB2, XPEDITER, and DBMS functions. 40 hrs/wk, 8:00 am - 5:00 pm, $64,000/yr. Upon application, must be able to perform job duties and be eligible for permanent employment in the U.S. Resumes to: FDLES Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, Florida 32302-0869. JOFL2015638.

HOT Network Housing

European High Rise

NSR Server Enclosure

- Winner of the European Industry Forum Award for Design Excellence.
- Multi-vendor server compatible.
- The ultimate in protection, security, and modularity.
- Large array of accessories to enhance your system.

Two-Story Duplex

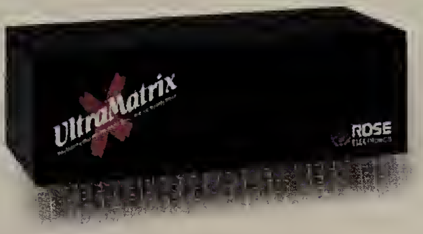
Pioneer Enclosure System

- Choose from full height, double-sector, and seismic designs.
- Separate housings for ISP and VPN rent space applications.
- Multi-vendor server compatible.
- Complete cable management and accessories.

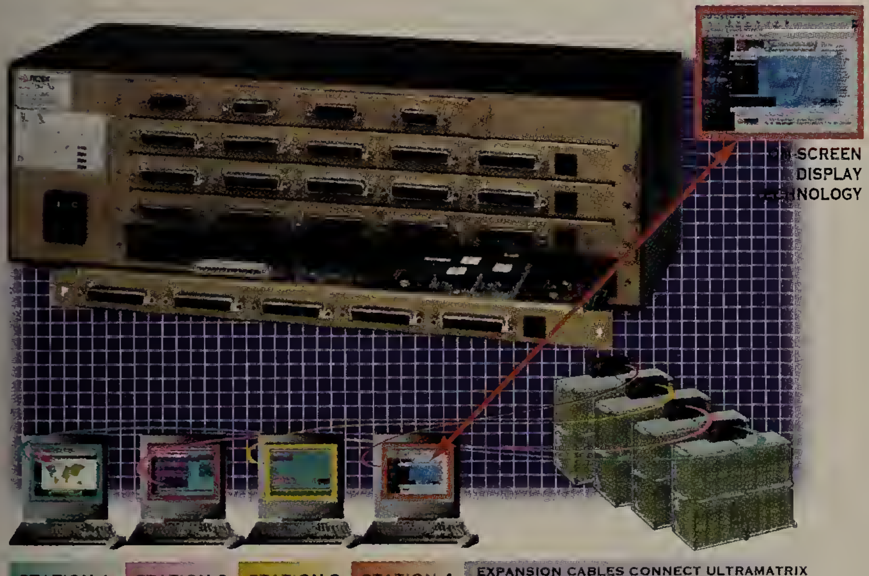
Call Today for a FREE Brochure:
Call: ***800.558.7297*** *E-mail:* ***mktg@apw-enclosures.com***

apw enclosure products

MANAGE 1,000 SERVERS
from 4 or more KVM stations



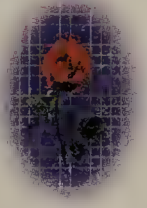
Celebrating our 15 Year Anniversary


N-SCREEN DISPLAY HNOLOGY
STATION 1
STATION 2
STATION 3
STATION 4
EXPANSION CABLES CONNECT ULTRAMATRIX FROM 1 TO 1,000 COMPUTERS!

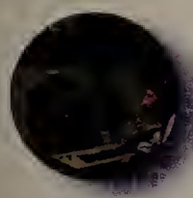
Rose has done it again! The UltraMatrix is a keyboard-video-mouse (KVM) switch that has all the features, is the simplest to use, and costs the least.

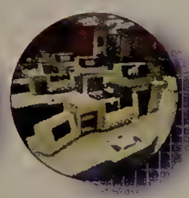
- Simultaneous access from 4 or more KVM stations
- Supports multiple platforms: PC, Sun, Unix, others
- Full keyboard and mouse emulation for automatic booting
- Expands easily with plug-in cards
- Sleek on-screen display simplifies user interface
- Innovative cabling system makes installation clean and easy
- Uses less rack space than other switches
- Security, access groups, user profiles, status screen, flash memory, and more

Rose has been providing innovative solutions since 1984. We have a complete line of KVM switches for server rooms, classrooms, desktops, and other uses. Ask us about our KVM extenders using coax or twisted pair. We also have an extensive line of serial and parallel data switches. Call us today to discuss your application.



GROW WITH ROSE PRODUCTS


AEROSPACE/MILITARY


COMPUTER ROOM

PLANT CONTROL

TRADING ROOM

CONTROL CONSOLES

CLASS ROOM/CORPORATE

USA OFFICE: 10707 STANCLIFF ROAD HOUSTON, TEXAS 77099 PHONE 281-933-7673 FAX 281-933-0044
UK OFFICE: PHONE +44 (0) 1264 850574 FAX +44 (0) 1264 850529

Call 800-333-9343 for your catalog

ROSE ELECTRONICS
WWW.ROSEL.COM

There's Network Control and Then There's

TOTAL NETWORK CONTROL...

The Environmental Manager Provides Total Control for your network.

- ★ *Reboot and manage remotely*
- ★ *User defined security sensors*
- ★ *8 console/power ports for direct connection*
- ★ *Monitor humidity and temperature*
- ★ *Ethernet port for direct connection to the network*
- ★ *Four dry contact ports for alarm sensing*

The Environmental Manager... Protects your investment and controls your environment

N BASE XYPLEX

1-800-338-5316
www.nbase-xyplex.com

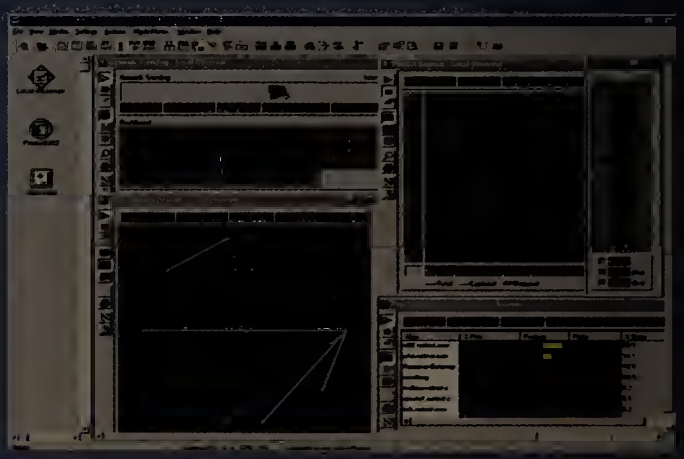
OBSERVER®

LAN/WAN TROUBLESHOOTING AND PROTOCOL ANALYSIS SOFTWARE SO OBSERVANT, IT CAN SEE ALL PORTS ON YOUR SWITCH.

- *Full packet capture and decode for over 300 protocols, including TCP/IP (v4 and v6), NetBIOS/NetBUEI, IPX/SPX, Appletalk, SNA, and DECnet.*
- *Switched mode sees all ports on a switch gathering statistics from the entire switch or packet capture from any port or ports.* ***Finally a protocol analyzer that can be used in switched environments!***
- *Long-term network trending collects statistical baseline data for days, weeks, months or years for review and reporting.*
- *Distributed version available for $1290 (includes 1 local and 1 remote Probe). Additional Probes are $295 per local or remote segment or switch.*
- *Network Instruments' optimized ErrorTrack™ NDIS drivers display true errors-by-station. Includes collision expert to identify problem stations.*
- *Track router utilization/traffic in real time*
- *Ethernet (10/100/1000), Token Ring, FDDI*

Observer identifies network trouble spots, and costs thousands less than expensive hardware-based analyzers. If you have network slowdowns would you know if they are being caused by packet errors, broadcast storms or overloaded utilization? Find out with Observer or Distributed Observer.

Observer's Extensions add to the functionality of Observer and Distributed Observer by providing SNMP object tracking, WEB browser based reporting, RMON1/2 Probe monitoring and Expert mode post-capture analysis - all within the Observer interface. Network Instruments' Probes are also available as RMON1/2 Probes for $295/each.



OBSERVER® 6
$995

OBSERVER EXTENSIONS

EXPERT EXTENSION FOR OBSERVER® $495	WEB EXTENSION FOR OBSERVER® $495
SNMP EXTENSION FOR OBSERVER® $495	RMON(2) EXTENSION FOR OBSERVER® $495

NETWORK INSTRUMENTS®

See what you have been missing! Call 800-526-7919 for a FREE DEMO or download from our web site.

www.networkinstruments.com

© 1999 Network Instruments, LLC - Corporate Headquarters (612) 932-9899 FAX (612) 932-9545, UK and Europe +44 (0) 1322 303045 FAX +44 (0) 1322 303056 info@networkinstruments.com www.networkinstruments.com Observer Network Instruments and the "N" logo are registered trademarks of Network Instruments, LLC [illegible] MN USA

Network managers – take control!

APC MasterSwitch™: the right answer for remote reboot requirements

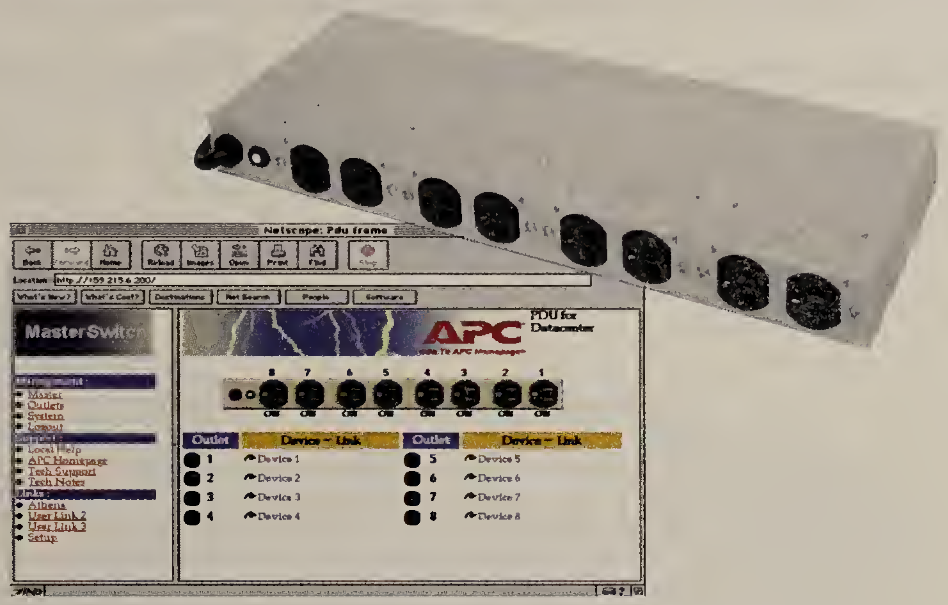
Imagine having the ability to power-on and power-off sensitive communications and computer equipment instantly in a remote office 800 miles away without raising an eyebrow. With APC's MasterSwitch™, you have no reason to panic, and no need to dispatch costly service people. You control power to remote equipment from your desktop or laptop via Web, SNMP, Telnet or modem connection.

Today, power management translates directly into high availability. For network operations, the ability to remotely reboot locked equipment and bring each device back on-line quickly represents a big boost in productivity.

The APC MasterSwitch saves corporations thousands of dollars a year by eliminating unnecessary field service technician calls. Test drive MasterSwitch and see what APC's Legendary Reliability™ is all about.

MasterSwitch benefits include:

- Eight independently controlled switchable outlets for remote rebooting of equipment
- Requires only 1U of rackmountable space
- Provides in and out-of-band connectivity to manage devices (Web, SNMP, Telnet or modem)
- Tremendous savings on costly field technician service calls



Visit APC's Web site today to receive your FREE APC Network Enhancement Solutions Kit and test drive MasterSwitch on-line before buying!

http://promo.apcc.com KEY CODE p399z

CALL: (888) 289-APCC x7579 • FAX: (401) 788-2797

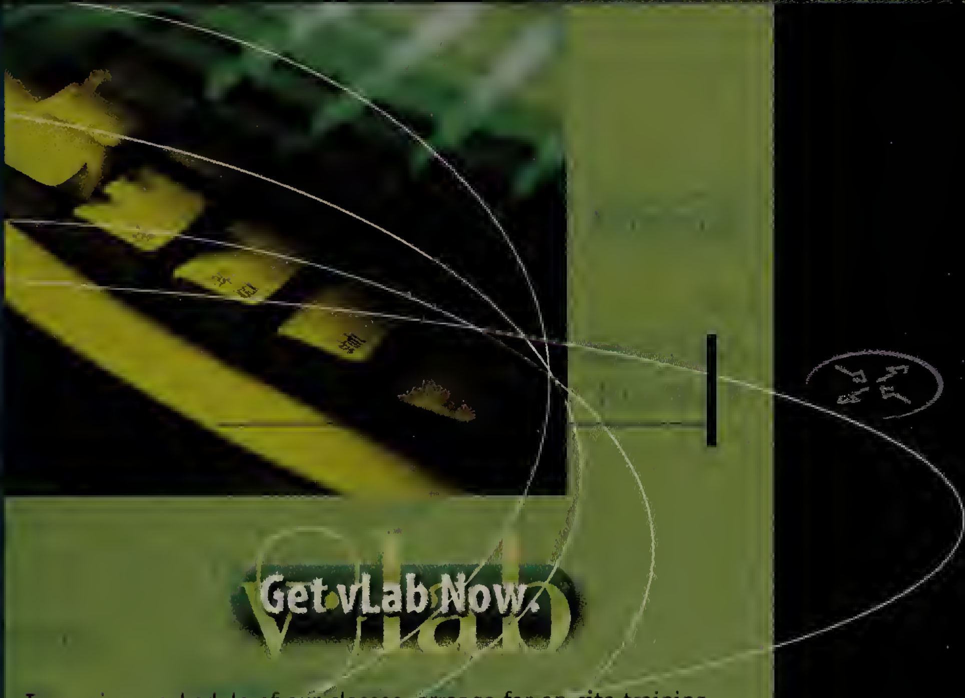
APC®
Legendary Reliability™

©1999 American Power Conversion. All Trademarks are the property of their owners. MS2A9EP-US • PowerFax: (800) 347-FAXX • E-mail: apcinfo@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892

Cisco Systems
Training Partner
Distinguished

get hands-on **skills** from the quality leader for network training and consulting

LEARN FROM CHESAPEAKE'S ELITE INTERNETWORKING EXPERTS!



To receive a schedule of our classes, arrange for on-site training or ask about our consulting services, call **800-447-5967.** Or check out our Web site at **ChesapeakeNetSolutions.com** or send an e-mail to training@ccci.com. Whatever the network problem, you'll find the solutions at Chesapeake!

Chesapeake is the quality leader in Cisco training. An important reason for our success has been our ability to offer you the highest quality, customized training for your personal or corporate needs. Building on this heritage, Chesapeake is proud to announce that we now offer a revolutionary web-based training service: vLab℠. Developed by MentorLabs, vLab provides online access to real Cisco gear and lab content written by networking experts. vLab is a perfect complement to Chesapeake's Instructor-Led Training and Consulting services, and allows us to offer you a more complete solution to your training needs. Contact Chesapeake at 1-800-447-5967 to discuss how we can best serve you.

CHESAPEAKE
Network Solutions
A Division of Mentor Technologies Group, Inc.

ChesapeakeNetSolutions.com

Visit our web site for the latest information on our training and consulting services.

Remote Reboot Over Telnet!

Reboot your Network Equipment via Telnet, Dial-Up and Local Console

Network equipment sometimes "locks-up" requiring a service call just to flip the power switch to perform a simple reboot. The NPS Network Power Switch gives network administrators the ability to perform this function from anywhere on the LAN/WAN, or if the network is down, to simply dial-in from a standard external modem for out-of-band power control.

✓ TCP/IP Security
✓ Individual Plug Passwords
✓ Dual 15 Amp Power Inputs
✓ Eight (8) Individual Outlets
✓ Modem and Console Ports
✓ Co-Location Features
✓ 115-VAC and 230-VAC Models
✓ Modem and Telnet Auto Reset

Individually Programmable Outlet Plugs (8)
10Base-T Ethernet Interface
19" Rack Brackets Allow Front, Back, or Center Mounting
Dual 15 Amp Power Circuits
Modem Port for Out-of-Band Management
Local RS232 Console Port

wti western™ telematic inc.

(800) 854-7226 • www.wti.com

5 Sterling • Irvine • California 92618-2517 • (949) 586-9950 • Fax: (949) 583-9514

Introducing the Router that's easier to configure.

Web Browser Configuration... It's Easier!

Introducing The Emerald, a Frame Relay Access Router to replace all others. Why? Web Browser Configuration! Use Netscape 4.5 or MS IE 4.0 to set up and configure your Emerald. The Emerald allows you to monitor your network from your desktop using the Web Browser you use every day. For less than the price of one week's training on those other routers, you can be up and running in minutes!

Call 800-223-9758 to receive a FREE demo Emerald to try for 45 days. If you're not convinced it's the easiest router you've used, send it back. What could be easier?

Take a look, you'll like what you see.

American TECHNOLOGY
www.atli.com

American Technology 800-777-5511or +1-406-777-5511 fax: 406-777-5512 email: info@atli.com

SNMPc Enterprise Manager

Distributed management for Windows NT. Supports remote consoles and polling agents, Web Trend Reporting and more.

SNMPc WorkGroup Manager

Affordable management for small networks. With an installed base of over 60,000 copies, this popular tool is resold by major OEMs, including Cisco and ACC.

Network Management
for Microsoft Windows

Castle Rock Computing
Phone: 408.366.6540
Fax: 408.252.2379

Download a Free Evaluation
www.castlerock.com

$ave.

Want a KVM switch that offers sure-fire savings? Choose a BLACK BOX® ServSwitch™. With ServSwitch technology, you only need *one* keyboard, monitor, and mouse to control *all* your servers. We've saved our customers over **$100 million** worldwide by eliminating unnecessary—and costly—keyboards, monitors, and mice!

We have the broadest line of KVM switches in the industry, backed by the best support services you'll find anywhere. Other companies simply can't offer the same free consultations, expert 24-hour tech support, and unbeatable warranties. At Black Box, they're part of the package.

Expect more. Save more. Choose BLACK BOX.

Call us for a *free* consultation at 724-746-5500 and start saving with ServSwitch.

BLACK BOX®

Remote Reboot

Servers
Routers
Kiosks
Anything!

PowerPAL From Dataprobe

From Any Telephone!
Anytime! Anywhere!

- 10 Amp AC Power Control
- Tone Controlled, On/Off Reboot
- Utilizes Existing Dial Line
- Security Password Protected
- Int'l, DC, Relay Versions Available

dataprobe INC.
11 Park Place Paramus, NJ 07652 Web: www.dataprobe.com

Extend Your Reach

WAY*too*COOL

ADAPT cools your computer, telecom and production areas. COOLIT 1000™ portable air conditioners are perfect for primary, supplemental and emergency cooling in permanent and temporary sites.

- ➤ Programmable Thermostat
- ➤ Energy Efficient
- ➤ Compact & Self Contained
- ➤ Quiet Cooling
- ➤ Instant Set-up
- ➤ User Friendly
- ➤ Only 80 Lbs.
- ➤ UPS Shippable

ADAPT
"Your Spot Cooling Specialists"
800-243-COOL

FREE Cooling Analysis Guide ONLINE!
www.coolestspot.com
The coolest spot on the web®

Hard drive duplication made easy.

You know the questions...

Load 500 systems? Upgrade all the PC's?
Windows 2000?
PC's ready by deadline?
Weekends of software loading?

Do you know the answer?

Image MASSter

Intelligent Computer Solutions www.ics-iq.com 888.994.4678

At Home,
How You Surf is
Your Business....

...AT WORK, IT'S OURS

Little Brother Displays:

- Who uses the Internet
- What kind of bandwidth they are using
- Where your users are going
- When your users visited sites
- How much bandwidth they used

Call Today for your Evaluation Copy

Little BROTHER

546 Valley Way, Milpitas, CA 95035
Ph: 1.800.200.9881 Fax: 408.263.9883
sales@littlebrother.com

Expert-led training solutions for Office 2000 applications, Microsoft Certification, Novell, Cisco, & Lotus.

Successful Solutions

CD-ROM • VIDEO • ONLINE

FOR COMPUTER USERS & IT PROFESSIONALS

Microsoft Certified Solution Provider

LearnKey™

Learn From The Experts™

www.learnkey.com

1.800.865.0165 Booth #6766 Source Code #109

Box®

The Simple, Powerful & Affordable

Firewall

- Proven Firewall Technology
- Network Address Translation
- Unlimited User License
- High Performance
- Transparent Network Access
- Easy to Configure & Operate
- Remote Web Based Management
- Cost Effective
- Time Based Access Control
- URL & Content Filtering
- Email, Pager & SNMP Trap Alerts
- Email Proxy
- ISDN, xDSL & Cable Modem Support
- Win95/NT Management Client

ICSA CERTIFIED WWW.ICSA.NET Firewall

$ 995.00

1-800-775-4GTA

Web: http://www.gnatbox.com
Email: gb-sales@gta.com
Tel: +1-407-380-0220 Fax: +1-407-380-6080

Global Technology Associates, Inc.

APC ensures network uptime, anywhere and everywhere

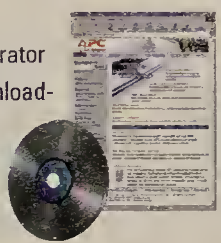
APC delivers enterprise-wide network up-time. Your full spectrum of network and power protection products are easily integrated in the innovative APC NetShelter®.

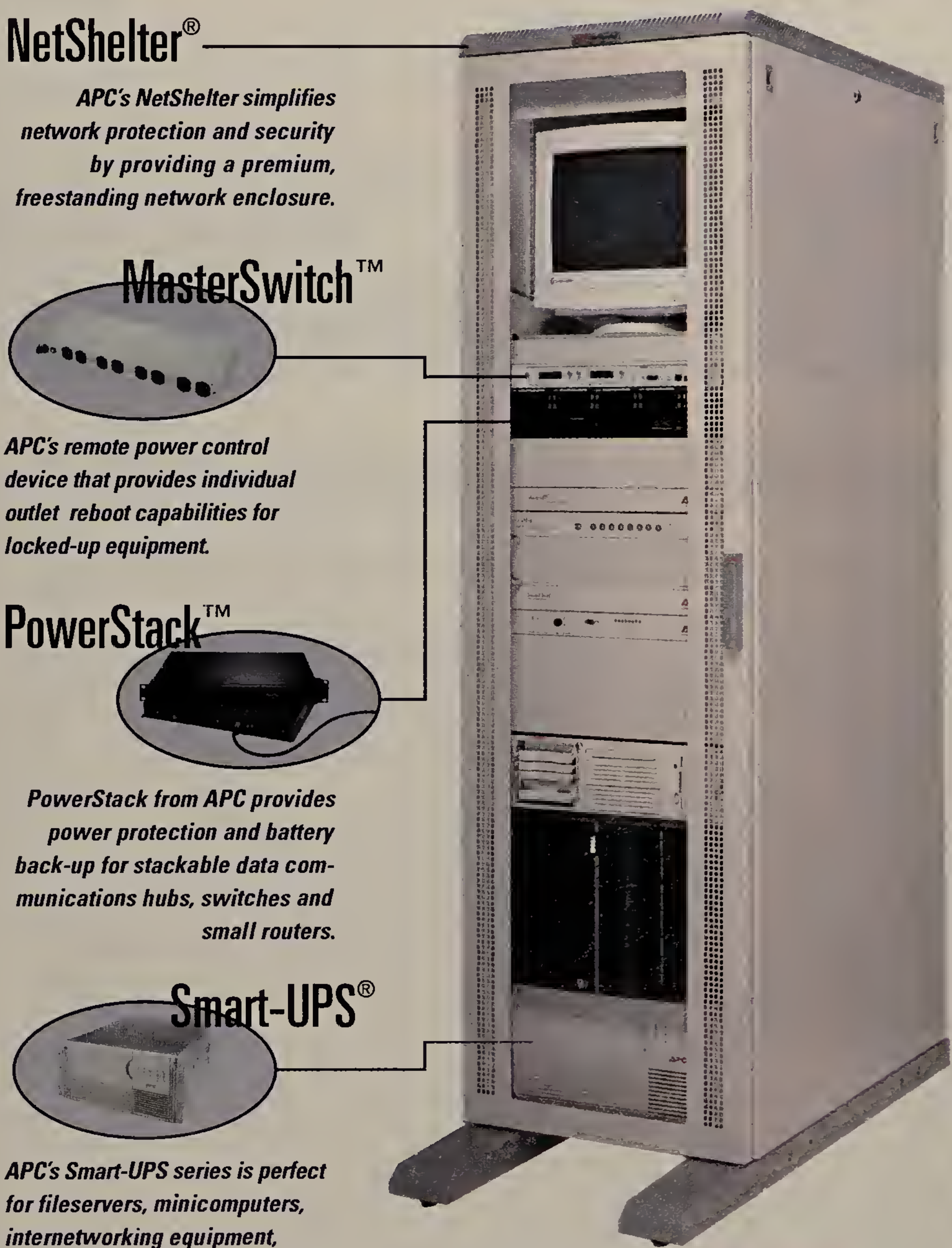
APC NetShelter simplifies network protection and security by providing a premium, freestanding network enclosure. It arrives ready to install and costs up to 20% less than other premium enclosures.

APC NetShelter saves floor space, organizes equipment, eliminates cabling "rat's nests" and physically protects your investment. NetShelter provides 42U (73.5") or 22U (38.5") of vertical space for industry-standard 19" rackmount equipment, yet easily fits through a standard 7' door.

APC NetShelter accommodates nearly all rackmountable equipment lines, including HP, IBM, Dell, Cisco and 3Com. Custom mounting kits allow easy installation of many rack-mount servers, disk storage or accessories.

Free NetShelter Configurator Software on CD or downloadable via our website at *www.apcc.com*





NetShelter®

APC's NetShelter simplifies network protection and security by providing a premium, freestanding network enclosure.

MasterSwitch™

APC's remote power control device that provides individual outlet reboot capabilities for locked-up equipment.

PowerStack™

PowerStack from APC provides power protection and battery back-up for stackable data communications hubs, switches and small routers.

Smart-UPS®

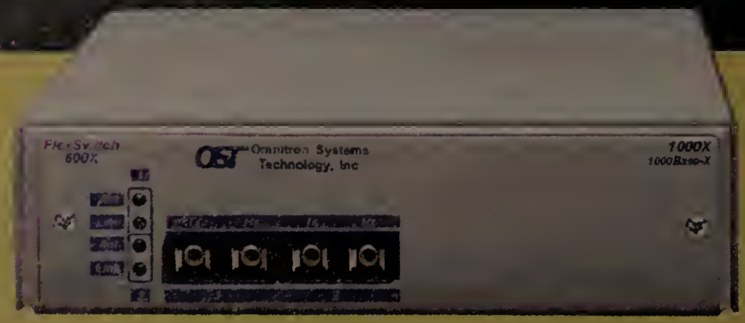
APC's Smart-UPS series is perfect for fileservers, minicomputers, internetworking equipment, telecommunications systems and other mission-critical applications.

APC Legendary Reliability™

FREE Internetworking Kit.
Learn how APC can make your network more manageable.

To order: Visit *http://promo.apcc.com* Key Code p400z • Call 888-289-APCC x7713 • Fax 401-788-2797

©1999 American Power Conversion. All Trademarks are the property of their owners. NS4A9EP-US
PowerFax: (800) 347-FAXX • E-mail: apcinfo@apcc.com • 132 Fairgrounds Rd., West Kingston, RI 02892 USA



Gigabit

{FlexSwitch 600XC 2Gx}

★ Functions as a switch, repeater, bridge & fiber converter
★ Extends distances up to 50 km
★ Full wire-speed; flow control
★ Compact design
★ Plug and play
★ Lifetime warranty

is here...

CALL NOW for free product information!
(800) 675-8410
(949) 250-6510

OST Omnitron Systems Technology, Inc.
Excellence in Local Area Networking

How Do You ReBoot Remote Equipment?

With Sentry!

Now with Sentry, you can reBoot any locked-up internetworking device through a standard dial-up modem, over an ethernet network via TCP/IP using Telnet, through a JAVA interface or with SNMP support. The Sentry family of products provides an easy, practical, and secure solution for power management of remote internetworking equipment. Select the Sentry model best for you.

Sentry Commander 110 VAC and 230 VAC
- 1 u rack
- Windows NT Shutdown support
- Console port access
- Multi password levels
- Group name functions
- Link up to 26 units
- Reboot control

Sentry -48 VDC
- 2 u rack
- 100 Amp power input feeds
- Supports 20 Amp and 35 Amp internetworking devices
- Reboot control
- Group name functions
- NEBs compliant

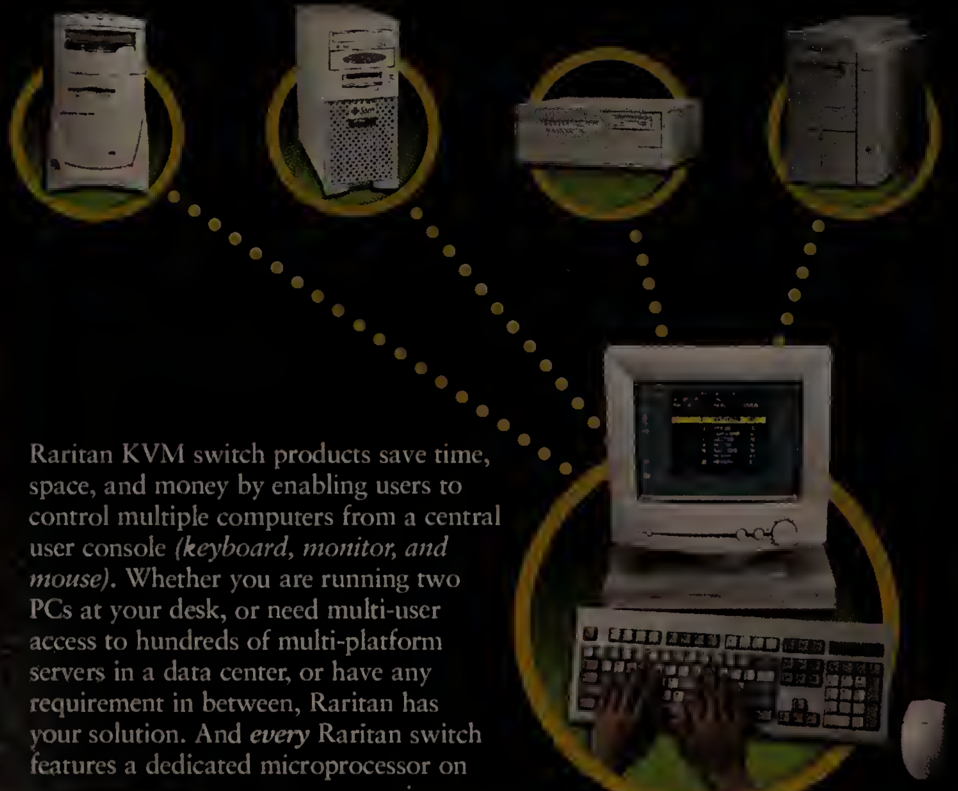
Benefits
- Reduces field service visits to POP sites
- Faster problem/ID solution response time
- Improved network availability
- Improved network service levels
- Improved facility security

See our complete product line at:
Web: www.servertech.com
Phone: 1-800-835-1515 or 1-408-745-0300
Fax: 1-408-745-0392

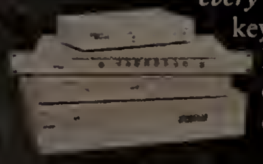
Another great product from
Server Technology Inc.

© 1999 Server Technology Inc. Sentry is a trademark of Server Technology Inc.

Control 2 to 256 computers with just one pair of hands.



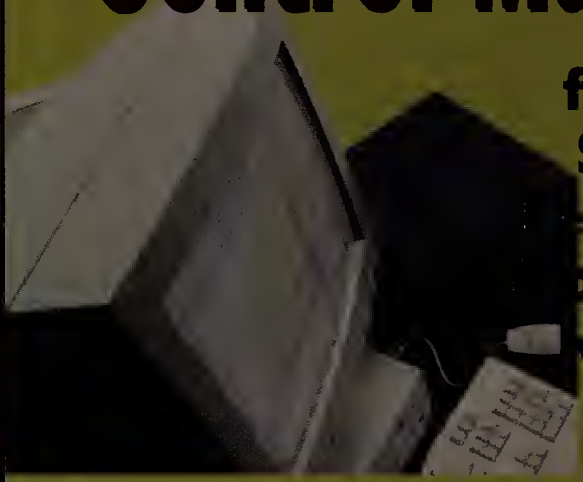
Raritan KVM switch products save time, space, and money by enabling users to control multiple computers from a central user console *(keyboard, monitor, and mouse)*. Whether you are running two PCs at your desk, or need multi-user access to hundreds of multi-platform servers in a data center, or have any requirement in between, Raritan has your solution. And *every* Raritan switch features a dedicated microprocessor on *every* port, preventing keyboard/mouse lock-up and ensuring flawless operation.



www.raritan.com
1-800-724-8090, X83

Reliability runs in the family.

Control Multiple PCs



from a Single Keyboard, Monitor & Mouse!

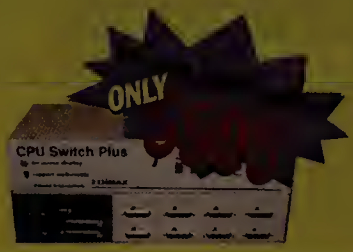
Edimax's CPU Switch Plus is the ultimate KVM Switch you will ever need to eliminate redundant peripherals, save office space, save energy cost and increase productivity.

On-Screen Display (OSD)

Easy Expansion

Multimedia Support

Affordable



EDIMAX
ISO-9001 Company
1-800-652-6776 www.edimax.com

Network World's Direct Response Card Decks deliver more than
157,500 Qualified Buyers!

NetworkWorld
Your Source For All Network Products and Services
Win a FREE Copy of "Success For Dummies"
MARCH

Next Deck: January 21, 2000
Ad Close: November 30, 1999
Bonus Distribution: ComNet 2000, Washington, DC

Call for more info on how to reach them! 800-622-1108 ext. 7507
or email at directresponse@nww.com

USED NETWORK HARDWARE
Routers • Switches • T1/T3 DSU/CSU • Access Servers • Cables • Memory
CISCO
Ascend • Livingston • Adtran • Kentrox
Buy / Sell / Lease • Overnight Delivery • Fully Guaranteed
800-451-3407
Fax 805-964-9405
www.networkhardware.com
Network Hardware Resale, Inc. • 6445 Calle Real • Santa Barbara • CA 93117

Livingston US Robotics
Ascend Micom
CISCO, BAY NETWORKS, CABLETRON, SYNOPTICS,
Specialist in all Cisco products including Memory
LAN/WAN Products
New, Used, Lease, Rent
3Com Codex
Adtran Xylogics
Motorola Wellfleet
We carry all Manufacturers
Millennium Solutions Group, Inc.
•Routers, Bridges •Frame Relay
•DSU/CSU's •Hubs, Modems
•Switches, ATM •Voice over Data
We Buy and Sell
888-801-2001 Fax (916) 630-2000
Visit our Web Site at:
http://www.millenniumsolutions.net

BUY, SELL OR ANNOUNCE
Network Products and Services with
Network World's Marketplace
Call 800-622-1108 ext. 7507

Cabletron Equipment
GUARANTEED
IN-STOCK OVER 20,000 UNITS READY TO SHIP
- 100% factory refurbished
- Only factory-authorized VAR
- 30 day hot swap, 1 year free repair
- We also carry: Bay Networks, 3Com, Compex, Cisco & more!

888-663-3313
VNETEK COMMUNICATIONS, LLC
Vnetek Communications, LLC
sales@vnetek.com • www.vnetek.com
Brand names are registered trademarks.

Do you offer Training or Educational Services?

If so, call Enku today to find out how to place your listing in our Training Directory.

Call 800-622-1108 ext. 7465

USED CISCO DIRECT
1-888-89-CISCO
VISA MasterCard

NETFAST
Save up to 80% on new/used:
➤ Rauters ➤ Switches ➤ XDSL ➤ T1 CSU/DSUs
➤ ATM ➤ Fast Ethernet ➤ ISDN ➤ Frame Relay
CISCO SYSTEMS
WE BUY USED
➤ CISCO ➤ Lucent/Livingstan ➤ Nortel/Bay Networks ➤ ADC Kentrax ➤ Xyplex
➤ Ascend ➤ 3COM/USRabatics ➤ Larscom ➤ Cabletron ➤ Newbridge ➤ Adtran
➤ Paradyne ➤ Digital Link ➤ Fare
➤ Motarala ➤ Netwark Assoc. ➤ IBM
www.digitalwarehouse.com
DIGITAL WAREHOUSE
Your Information Superhighway Discount Source
Netfast Communications Inc., 56-29 56th Drive, Maspeth, NY 11378 USA
Phone: 1-888-892-4726 or 718-894-7500 Fax 718-894-1573

NETWORKING
New & Used Buy • Sell • Trade
IBM
CISCO
BAY NETWORKS NORTEL
CABLETRON
ASCEND/LUCENT
3COM
FORE
XYLAN
www.bizint.com
NY Office/USA Sales:
Tel: (315) 458-9606
Fax: (315) 458-9493
BIZI
Main Office/Int'l Sales
Tel: (978) 667-4926
Fax:(978) 663-0607

REFURBISHED NETWORKING EQUIPMENT
The First Name in Second Source Networking Equipment
BUY, SELL, LEASE/RENT, TRADE
Routers, Hubs, Switches, Comm. Servers
CISCO
BAY NETWORKS, 3COM, ASCEND, LIVINGSTON, XYPLEX
*All trademarks are the property of their respective owners
Technical Support • Product Warranty • Aggressive Pricing
1-800-832-6539
FAX: 612-944-3534
VOICE: 612-944-3440
Email: sales@interlinkcom.com
http://www.interlinkcom.com
InterLink COMMUNICATIONS
7667 Cahill Rd, Suite 400, Minneapolis, MN 55439

TRAINING DIRECTORY

Cable University
(800) 537-8254
www.CableU.net
FREE online training in network cabling installation & maintenance

Certified NetAnalyst
(800) 645-8486
WWW.PINEMOUNTAINGROUP.COM
Protocol & Analyzer Training
Sniffer, Fluke, HP, Shomiti

CrossTec's NetOp School SW
(800) 675-0729
www.CrossTec.Net
Six essential tools for the networked classroom. Download a Free Eval

Cyber Pass Inc.
(613) 237-4991
www.certify.com
A+, CNE, MCSE exam simulation software-FREE to try!

ForeFront Direct
(800) 475-5831
www.ffg.com
Computer based training for the I.T. industry

LearnIT Corporation
(800) 352-4806
www.Learnitcorp.com
MCSE & End User State-of-the-Art Simulation Technology

LearnKey, Inc.
(800) 865-0165
www.learnkey.com
Self-Paced Training for Computer Users & IT Professionals

Marcraft Intl. Corp.
(800) 441-6006
www.mic-inc.com/Aplus/cbt
A+, Net+, CAT5, LINUX, Microsoft, CISCO, CBT & Self-Paced

NCR Customer Education
(800) 845-2273
www.ncr.com/trainus
Cisco, MCSE, NT & Networking, Training

TCIC
(800) 322-2202
www.tcic.com
Telecommunications + Data Comm., On-Site + CD's also available.

Transcender Corporation
(615) 726-8779
www.transcender.com
MCSE, MCSD, MCP Exam Simulations

Wave Technologies
(800) 711-0286
www.wavetech.com
MCSE, Cisco, MCSD, A+, Network+, CNE.Bootcamps, Online, Selfstudy

Contact these companies today to help you with your training needs!

4LANWAN.COM

Purveyors of Networking Hardware

NEW & USED
Switches, Modules, Routers, Hubs & More

Cisco Systems · proteon · SynOptics · SMC · 3Com · WORLD'S LARGEST SUPPLIER · NEW / USED 3 COM PARTS · USRobotics · Bay Networks · CABLETRON SYSTEMS · intel · CHIPCOM

BUY & SELL
Quantity, Reseller, Government & Education, Discounts available.

LOWER PRICES THAN THOSE WAREHOUSE GUYS!

- Lowest Prices on Factory Fresh Equipment
- Up to 90% OFF Retail for Refurbished Items
- Huge Inventory of Legacy Products
- Factory Trained Consultants on Staff
- Authorized Service Center
- We Also Do Repairs & Exchanges
- Same Day Shipping on Most Items
- Same Day Delivery Via Counter Service

GIANT INVENTORY
HUGE DISCOUNTS

Fax us Your Want to Sell / Buy Lists @ 516-293-5325

Visit our Web Site with On-Line Shopping & Auction @ WWW.4LANWAN.COM
A Division of Ergonomic Enterprises, Inc.

CALL TOLL FREE: 1-877-4LANWAN
International Calls: 001-1-516-293-5200 / E-mail: Sales@4LANWAN.COM

WWW.4LANWAN.COM, Inc.
A Division of Ergonomic Enterprises, Inc.
47 WERMAN CT · PLAINVIEW, NY · 11803

C.O.D.
Net Terms
Our 16th Year

logos are registered trademarks of the companies they represent

---

"Good As New" Networking Equipment
Good As New Warranties

Visit us On the Web @ www.nle.com

NORTEL NETWORKS · Bay Networks · CISCO SYSTEMS · 3Com · CABLETRON SYSTEMS

- **Authorized** Nortel-Enterprise Solutions Provider
- **Free Technical Support** on Purchased Equipment
- **Free Network Design** Support
- **Largest Inventory** in the Industry
- **Best Priced** Memory Upgrades

888.891.4229 FedEx

C.O.D's Terms

Phone 801-377-0074
Fax 801-377-0078
1403 W. 820 N. Provo, UT 84601

A *Network World* Special Issue

Issue Date: Dec. 27/Jan. 3 Ad Close: December 15

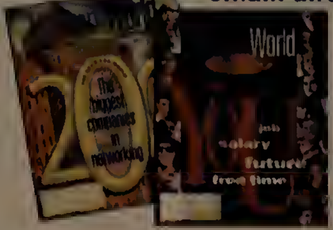
Pump up your advertising with Network World's Signature Series Power Issue. It has everything you need for high-impact advertising rolled into one essential solution. The award-winning Power issue is chock full of everything powerful in networking — the most powerful people, the mightiest companies and the hottest trends.

In This Special Issue...

- *Power Pack*
  - 10 Most powerful companies
  - Power-o-meter
  - The power of money
  - Power prognosticator
- *Profiles in Power*
  - 25 most powerful people
  - A decade of power
  - Power-o-meter
  - Washington powerbrokers
- *Power Struggles*
  - Cisco vs. the world
  - The fight for e-$trillions
  - IPSec ills
  - Privacy, the two-edged sword
  - ASP acrobatics
  - Building SAN castles
  - Phones vs. the Feds
  - The power of dot.com
- *Personal Power*
  - How to increase your power in the new year
  - Power in the community
  - Where the powerful people hang

Call your sales representative today for more information on how you can be part of The Power Issue!

Tel: 800-622-1108 ext. 7507 ✦ Fax: 508-628-3976
email: directresponse@nww.com



The NetworkWorld Signature Series

800-783-8979
Fax 916-781-6962
We Carry ALL Manufacturers

Specializing In:
3-Com
Nortel
Bay Networks
Cabletron
CISCO
Ascend
Fibermux
Livingston
Micom
Motorola
Synoptics
Data/Voice
Network
Solutions
www.adcs-inc.com

LAN/WAN
BUY/SELL
NEW/USED
RENT/LEASE
Fully Warrant
Switches
Hubs
Bridges
Routers
Multiplexers
T-1 Equipt
DSU/CSU
Modems

Alternative
Data
Communicati
Sources In
916-781-6952

CISCO
Systems/F[illegible]/Memor

CISCO EQUIPMEN

Also Available: Wellfleet, Bay, Fore
Xylogics, Livingston, & Ascend
In Stock • Fast Delivery • No Expedite Charg

COMSTAR, INC.
The #1 Network Remarketer
612•835•5502
Fax 612•835•1927 E-Mail:sales@comstarinc.c

---

nsgdata.com
NETWORK SERVICES GROU

specialists in

Year 2000

telex and X.25

solutions worldwid

1.800.270.2669 301.662.5
www.nsgdata.com

Network World, Inc.

Evilee Thibeault, President/Publisher
Eleni Brisbois, Administrative Planning Manager

FINANCE

Mary Fanning, Vice President Finance
Paul Mercer, Finance Manager
Mary Kaye Newton, Billing/AP Coordinator

HUMAN RESOURCES/ADMINISTRATION

Monica Brunaccini, VP of Human Resources/Admin.
Frank Coelho, Office Services Manager
Lisa Smith, Telecommunications/HR Coordinator
Mark Anderson, Mailroom Supervisor
Chris Cormier, Mailroom Assistant

MARKETING

Hillary Freeley, Sr. Director of Marketing
Kristin Wattu, Marketing Communications Manager
Barbara Sullivan, Sr. Marketing Research Analyst
Donna Kirkey, Marketing Design Manager
Judy Schultz, Graphic Designer/Marketing Specialist
Cindy Panzera, Marketing Specialist

GLOBAL PRODUCT SUPPORT CENTER

Nancy Parquette, Event Planner

ADVERTISING OPERATIONS

Karen Lincoln, Sr. Director of Advertising Operations
Ann Jordan, Supervisor of Advertising Operations
Maro Eremyan, Advertising Coordinator
Kris Guay, Direct Response/Recruitment Ad Coordinator

PRODUCTION

Ann Finn, Sr. Production Director
Greg Morgan, Production Manager
Mario Matoska, Print Buying Supervisor

CIRCULATION

Sharon Smith, Senior Director of Circulation
Richard Priante, Director of Circulation
Christine Rhoder, Circulation Marketing Manager
Bobbie Cruse, Subscriptions Manager
Mary McIntire, Circulation Coordinator

RESEARCH

Ann MacKay, Research Director

DISTRIBUTION

Bob Wescott, Distribution Manager/(508)879-0700

IDG LIST RENTAL SERVICES

Paul Capone, Account Executive
P.O. Box 9151, Framingham, MA 01701-9151
(800) 343-6474/(508) 370-0825, FAX:(508) 370-0020

SEMINAR AND EVENTS

Steven Engel, General Manager Seminars & Events
Andrea D'Amato, Sales Director/Strategic Partnerships
Debra Becker, Dir., Marketing & Audience Development
Kevin Gilligan, Event Producer
William Bernardi, Sr. Manager, Logistics and Operations
Maureen Whiting, Marketing Manager
Kristin Ballou, Account Manager, Seminars & Events
Betty Amaro, Senior Financial Analyst
Jill Keaveney, Senior Event Planner
Tim DeMeo, Event Coordinator
Tricia Fiscale, Sales and Marketing Assistant
Shannon Quaglia, Marketing Specialist
Jennifer Suwalski, Exhibit Services Representative
Sandy Weill, Group Sales Manager, Seminars & Events

ONLINE SERVICES

Adam Gaffin, Online Editor
Sandra Gittlen, Managing Editor
Jason Meserve, Staff Writer
Sheryl Hodge, Online Copy Editor

INFORMATION SYSTEMS/IMAGING SERVICES

Michael Draper, Vice President Information Systems
Rocco Bortone, Network Manager
Kevin O'Keefe, Systems Manager
Brian Wood, Senior Support Specialist
Greg Bloch, TeleCom/Network Specialist
Anne Nickinello, Senior Manager, Imaging Services
Deborah Vozikis, Senior Imaging Specialist
Sean Landry, Imaging Specialist

IDG

Patrick J. McGovern, Chairman of the Board
Kelly Conlin, CEO

Network World is a publication of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 275 computer publications in 75 countries. Ninety million people read one or more IDG publications each month. *Network World* contributes to the IDG News Service, offering the latest on domestic and international computer news.

Network World Technical Seminars are one- and two-day [illegible] seminars [illegible] bring the latest networking technologies. All of our seminars are also available for [illegible] or [illegible] training. For complete and [illegible] information on our current seminar offerings, call a seminar representative at [illegible], or go to [illegible]/seminars.

NetworkWorld

EDITORIAL INDEX

A
Acer ... 22
America Online ... 6
Apple ... 63
AT&T ... 6
B
Banter Technology ... 10
C
Cabletron ... 6
Caldera ... 22
Cisco ... 25
Colorstamps.com ... 16
Corel ... 22
D
Dell ... 6
E
eTime Capital ... 37
F
FVC.com ... 37
I
IBM ... 6
InfoValue Computing ... 63
Intel ... 6
L
Lucent ... 34
M
Madge Networks ... 22
MCI WorldCom ... 34
Microsoft ... 6, 63
Mission Critical Software ... 40
N
NetVision ... 10
Novell ... 8
O
OneSoft ... 10
P
Pivotal Networking ... 22
R
Real Networks ... 63
Red Hat ... 22
S
Sun-Netscape Alliance ... 37
V
VCON ... 21
Vialog ... 37
Vixel ... 22
V-Span ... 37
W
WebTrends ... 37

ADVERTISER INDEX

Advertiser	Page#	URL
3Com Corp	7	www.3com.com
Adept	74	www.coolspot.com
Adtran	9	www.adtran.com
Agilent Technologies	14-15	www.agilent.com
American Power Conversion	33, 35	www.apcc.com
American Power Conversion	71, 75	www.apcc.com
American Technology	72	www.atli.com
*Ameritech	54	www.ameritech.com
APW Enclosure Products	69	www.apw.com
ArrowPoint Communications	60	www.arrowpoint.com
Black Box Corp	73	www.blackbox.com
Cable & Wireless	41	www.gettheconnection.com
Castle Rock Computing	72	www.castlerock.com
Check Point Software	36	www.checkpoint.com
Chesapeake Network Solutions	71	www.chesapeakenetsolutions.com
Compaq	11, 84	www.compaq.com
Concord Communications	25	www.empire.com
Dataprobe Inc	74	www.dataprobe.com
Edimax Computer Company	76	www.edimax.com
Ericsson	17	www.ericsson.com
Extreme Networks	66	www.extremenetworks.com
Global Technology Associates	75	www.gnatbox.com
Globix	51	www.globix.com
Inktomi Corp	22-23	www.inktomi.com
Instant Video Technologies	44	www.burst.com
Intel Corp	30-31	www.intel.com
Intelligent Computer	74	www.ics-iq.com
iPivot	38-39	[illegible]
Learnkey Inc	75	www.learnkey.com
LittleBrother	74	www.littlebrother.com
Microsoft Corp	2-3	www.microsoft.com
Motorola	42-43	www.digitaldna.motorola.com
Motorola Semiconductor Products	26-27	www.digitaldna.com/coppergold
Nbase Communications	70	www.nbase-xyplex.com
NetScreen Technologies	87	www.netscreen.com
Network Instruments	70	www.networkinstruments.com
Network Peripherals	57, 59	www.npix.com
Nortel Networks	83	www.nortelnetworks.com
NTT America Inc	32	www.nttamerica.com
Omnitron	76	www.omnitron-systems.com
Quantum	46-47	www.snapserver.com
RAD Data Communications	34	www.rad.com
Raritan Computer	76	www.raritan.com
Rose Electronics	69	www.rosel.com
Server Technology	76	www.servtech.com
Spectrum	45	www.spectrummgmt.com
Sprint	28	www.sprint.com
Unisphere Solutions	18-19	www.unisphere.cc
UUNET	20	www.uu.net
Veritas Software	4	www.veritas.com
Western Telematic	72	www.wti.com
Winnet MCS Inc	13	www.winnetmcs.com
WRQ Inc	24	www.wrq.com

Network World Fusion – www.nwfusion.com

3M
American Power Conversion
Arrowpoint Communications
BMC Software
Compaq
Ganymede Software
GTE
IBM
InstallShield
Intraware
Knowledgenet
Latitude
N.E.T.
Netmoves
Netsolve
Nortel
Process Software
PSI Net
Top Layer Networks

These indexes are provided as a reader service. Although every effort has been made to make them as complete as possible, the publisher does not assume liability for errors or omissions.

*Indicates Regional/Demographic

Sales Offices

Carol Lasker, Associate Publisher
Debbie Lovell, National Sales Operations Manager
Internet: clasker, dlovell@nww.com
(508) 875-6400/FAX (508) 879-5760

NEW YORK/NEW JERSEY

Tom Davis, Advertising Director/Eastern Region
Elisa Della Rocco, District Manager
Internet: tdavis, elisas@nww.com
Aimee Jacobs, Sales Assistant
(201) 587-0090/FAX: (201) 712-9786

NORTHEAST

Donna Pomponi, Senior District Manager
Kevin Gasper, District Manager
Internet: dpomponi, kgasper@nww.com
Linda Bishop, Sales Assistant
(508) 875-6400/FAX: (508) 879-5760

MID-ATLANTIC

Jacqui DiBianca, Senior District Manager
James Kalbach, Account Executive
Internet: jdibian, jkalbach@nww.com
Rebecca Showers, Sales Assistant
(610) 971-1530/FAX: (610) 975-0837

MIDWEST/MARYLAND

Eric Danetz, District Manager
Aimee Jacobs, Sales Assistant
(201) 587-0090/FAX: (201) 712-9786

CENTRAL

Dan Gentile, Midwest Regional Manager
Internet: dgentile@nww.com
Kristin Baker, Sales Associate
(512) 249-2200/FAX: (512) 249-2202

NORTHERN CALIFORNIA

Sandra Kupiec, Advertising Director/Western Region
Susan Rastellini, Senior District Manager
Lara Greenberg, District Manager
Sean Weglage, District Manager
Internet: skupiec, slr, lgreenba,
sweglage, lettarson@nww.com
Lisa Ottersen, Regional Sales Operations Manager
Mark Hiatt, Sales Assistant
(408) 567-4150/FAX: (408) 567-4166

NORTHWEST/ROCKIES

Carol Stiglic, Senior District Manager
Karen Weiss, Senior District Manager
cstiglic, kweiss@nww.com
(408) 567-4150/FAX: (408) 567-4166

SOUTHWEST

Rachel Gillis-Swartz, Senior District Manager
Becky Bogart Randell, District Manager
Internet: rswartz, brandell@nww.com
(949) 250-3006/FAX: (949) 833-2857

SOUTHEAST

Don Seay, Senior District Manager
Internet: dseay@nww.com
Terry Sanders-Prentice, Sales Assistant
(404) 845-2887/FAX: (404) 250-1646

DIRECT RESPONSE ADVERTISING
Response Card Decks/Marketplace

Richard Black, Director of Direct Response
Kathryn Zinn, Sr. Account Manager
Karima Zannetti, Account Manager
Enku Gubaie, Account Manager
Internet: rblack, kzinn,
kzannett, egubaie@nww.com
Sharon Chin, Sr. Media Dev. & Operations Mgr.
Chris Gibney, Sales Assistant
(508) 875-6400/FAX (508) 628-3976

RECRUITMENT ADVERTISING

Deanne Holzer (212) 828-6691
Caryn Dlott (508) 879-0700 x6304

Publicize your press coverage in *Network World* by ordering reprints of your editorial mentions. Reprints make great marketing [illegible] and are available in quantities of [illegible] and up. To order, contact Reprint Management Services at Greenfield Corporate Center 1811 Olde Homestead Lane, Lancaster, PA 17601 (717) 399-1900 fax (717) [illegible] E-mail rtry@rmsreprints.com

ASPs,
continued from page 1

qualified IT staffers to anticipated cost savings to the challenge of keeping up with application upgrades.

And while ASP services generally have been considered most attractive for small and midsize companies, our survey shows that large companies also are embracing ASPs. One-fourth of the respondents who told us they are using ASPs said they work for companies that employ more than 20,000 people.

It's too soon to know if increased demand will amount to the kind of market that ASPs and their investors envision.

ASP REALITY CHECK

Last in a four-part series.

Venture capital firms are putting millions of dollars into new ASPs, and established software, hardware and services companies are vying aggressively for a big piece of the ASP pie that industry watchers say could be worth as much as $23 billion in five years.

Whether the market actually gets that big will depend largely on whether companies that are waiting to see what happens don't wait too long.

"The market is still too new," says Jonathan Wilson, PC specialist for Hickory Springs Manufacturing in Hickory, N.C. "I would have to wait for it to mature some in order to make a decision to go with outsourcing. It just feels too fly-by-night and too much of a security risk right now."

Taking the ASP plunge

Companies that have taken the ASP plunge have done so with a variety of applications (see Fig. 1).

Payroll proved to be the most popular application to outsource, with 30% of respondents reporting that they currently outsource this key function.

Manufacturing company Lochinvar in Nashville expects to outsource its payroll applications in the next year or so.

"With the growth of our company . . . we've had to put up big money for servers that would suffice for a while, then we find ourselves adding more," says Mark Gamboa, a network administrator. "If there is a company that can control that for us, that can grow as we grow, it would save us a lot of money."

Other applications scoring well in the survey were e-commerce, messaging, human resources, inventory management, accounting and intranet applications. Companies also said they have handed over marketing, supply chain, customer support and enterprise resource planning applications to ASPs.

In perhaps the most high-profile application outsourcing move to date, United Airlines two weeks ago announced that it was scrapping its aging client/server e-mail system and awarding USA.Net a contract to manage 20,000 Web-based e-mail seats. The company decided to outsource its e-mail after asking itself the basic question: "What is our core competency?" says Nirup Krishnamurthy, director of business systems development at the airline's information services division.

As for why companies are using ASPs, difficulty retaining experts on staff was an extremely or very influential reason for more than 40% of respondents.

One respondent, for instance, went with an ASP after deciding to move from financial applications developed in-house on AS/400s to Oracle financial applications. The data communications manager, who asked not to be named, said the software change would have required the company to hire more IT staff. Instead, the company cut a deal with an ASP, whose staff now handles all software and systems upgrades for the customer.

"The cost savings were realized by not having to hire staff to support the applications," the data communications manager says. "That was the best justification for going with an ASP."

Sterling Capital is renting Microsoft Office 2000 applications from an ASP called TeleComputing and will start renting a Great Plains accounting package early next year. The company teamed with TeleComputing because it wanted to focus on hiring professionals for its new educational investments and not IT staffers.

"We didn't have the expertise, and we didn't want to make the investment in an IT staff," says Steven Fragapane, chief information officer at Sterling, an investment firm in Baltimore.

The firm is operating a company called Sylvan Learning Centers with the plan to sell these centers in the future. So Fragapane doesn't want to install, maintain and deploy applications that may be thrown out or viewed as a debt by potential buyers.

Business users already working with an ASP say they like the service provider's ability to move quickly from initial deployment to ongoing software support. In fact, more than 80% of respondents said that an ASP's ability to upgrade a customer's applications was somewhat to extremely influential in their decision to team with an ASP.

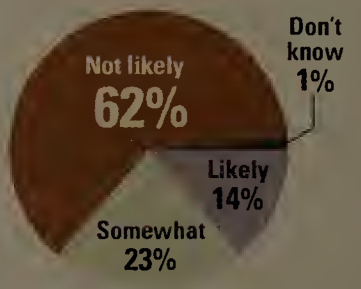
US at Work, a Web start-up that supports a portal site for business users that's similar to the Yellow Pages, teamed with an ASP called Corio because it needed its PeopleSoft system up and running quickly. The decision enabled the customer to get its applications online in weeks rather than months, says Larry Lilliback, project manager at US at Work.

"The fact that Corio could rapidly deliver the system and offer continuous upgrades was very attractive to us," Lilliback says. "And Corio offers Siebel Systems [customer relationship management] software that we plan on adding in the near future," he says.

Figure 1. Not sold on ASPs . . . yet

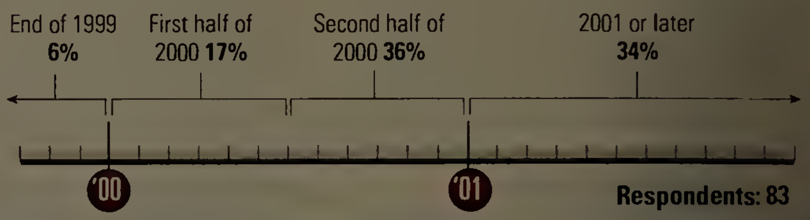
About one-third of companies not using ASPs said they could be swayed, and most of them would likely make the move by the end of next year.

How likely is your organization to outsource any of its applications to an ASP in the future?



Respondents: 229

When do you anticipate your organization will outsource any of its applications?



Respondents: 83

Outsourcing, current and planned

The top applications that users are outsourcing:

Payroll	30%
Intranet	25%
Accounting	20%
Messaging/groupware	19%
Electronic commerce	19%
Human resources	17%
Inventory management	17%

Respondents: 59

Major areas where outsourcing is planned:

Electronic commerce	27%
Intranet	23%
Messaging/groupware	23%
Payroll	22%
Sales/customer support	17%
Inventory management	17%

Respondents: 83

Note: users were allowed more t[illegible]

HOW WE DID THE SURVEY

The survey was conducted on behalf of *Network World* by Aspen Media & Market Research of Boulder, Colo.

The research firm completed telephone interviews for the survey between Oct. 21 and Nov. 4.

Most of the people surveyed had titles such as network manager, IS manager or corporate manager. The survey participants were from a variety of organizations, including those in the education, manufacturing, retail and government fields.

Network World, 161 Worcester Road, Framingham, Mass. 01701-9172, (508) 875-6400

Periodicels postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by *Network World,* Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

Network World is distributed free of charge in the U.S. to qualified management or professionals.

To apply for a free subscription, complete and sign the qualification cerd in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on the information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Nonqualified subscribers: $5.00 e copy; U.S. - $129 a year (except Washington, DC,$136.74); Canada - $160.50 (including 7% GST, GST#126659952); Central & South America - $150 a year (surface mail); Europe - $205 e year (surface mail), ell other countrios - $300 a year (airmail service). Four weeks notice is required for chenge of eddress. Allow six weeks for new subscription service to begin.

Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor,Mich. 48106.

PHOTOCOPYRIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by *Network World,* Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the erticle, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World,* P.O. Box 3090, Northbrook, IL 60065

Copyright 1999 by *Network World,* Inc. All rights reserved. Reproduction of materiel appearing in *Network World* is forbidden without written permission.

Reprints (minimum 500 copies) and permission to reprint mey be purchased from Reprint Manegement Services, Greenfield Corporate Center, 1811 Olde Homestead Lane, Lancaster, PA, 17601, (717) 399-1900, Fax: (717) 399-8900, E-Mail: rtry@rmsreprints.com

USPS735-730

One thing that early ASP adopters are learning is that every ASP is different, a subject we tackled in Part Two of this series (*NW*, Nov. 15, Page 7). In light of this, customers are devising interesting approaches to working with ASPs to address their specific business needs.

Database Production Services (DPS) is a Lombard, Ill., data processing company that works with marketing firms and banks, creating clean data records used in direct mail and advertising programs. DPS evaluated ASP bids to create and deploy a new Oracle-based application for its clients.

But having ASPs build a custom application would have sent costs skyrocketing and dragged the deployment time out, says Slav Gadomski, vice president of operations. Instead, DPS' own database administrators and programmers built the application and its database, which an ASP will host and manage. In effect, the company will use an ASP as an extension of its data center operations, eliminating the need to have staff working 24-7.

"We're in final beta testing right now," Gadomski says. "Total project time has been about 18 months. We saved roughly nine months by using an ASP to host the application."

Healthy dose of skepticism

Even companies that are using ASPs have their reservations (see Figure 2).

More than 90% of ASP users said they are somewhat to extremely concerned about the ability of their service provider to keep data secure, to ensure optimal application performance and to respond quickly to changing customer needs. There is also some edginess over the relatively unproven ASP business model.

"I wouldn't even recommend going with an ASP until the right type of data security was in place, and by that I mean 512-bit key encryption," says Jeremy Cohen, telecommunications specialist at the Department of Veterans Affairs in Washington, D.C. He is concerned about the vulnerability of data shipped over a WAN to servers at different sites.

As for companies that are not using ASPs, most of the reluctance has to do with giving up direct control over applications that are essential to business (see Figure 3).

Loss of control was cited by 46% of respondents as very or extremely important in their decision not to use an ASP.

"It's kind of scary that someone can take that much control of your business," Lochinvar's Gamboa says. "With the control they have, you're forced to use certain products and to go along with how well they can support you."

As we reported in Part One of this series on ASPs (*NW*, Nov. 8, Page 1), customers are also concerned about the lack of customization of applications that they can expect from ASPs.

"There is not much of a market out there that will support the vertical solutions we've developed internally," says Mark Henry, network staff manager at Lupkin Conroe Communications, a Douglas, Texas, telecommunications services reseller. "Our billing and support applications are very specialized for our industry. I don't see any of the ASPs providing that kind of flexibility."

More than 40% of respondents not using an ASP said worries over whether ASPs can ensure continuous availability of applications are very or extremely important in their decisions to keep their applications in-house.

"The ASPs have to have the infrastructure on the back end to be able to run a service business," says a network manager with an airline who asked not to be identified. "But most ASPs don't want to build massive data centers."

Companies that have already made big investments in their own data centers and applications say they can't really justify going with ASPs.

Other inhibitors to trying out ASPs are concerns about security, customer support and the basic sustainability of the ASP business model (in other words, will the ASPs be around in a few years).

So what might turn the skeptics into believers?

Well, 43% of those not using ASPs say "nothing" could change their minds. So the ASPs have their work cut out for them there.

But about one-third of the companies that said they are not very or at all likely to go to an ASP also said the move to totally new applications could be a reason for them to reconsider ASPs. Also, the emergence of strong service-level guarantees and testimonials from early adopters could sway them.

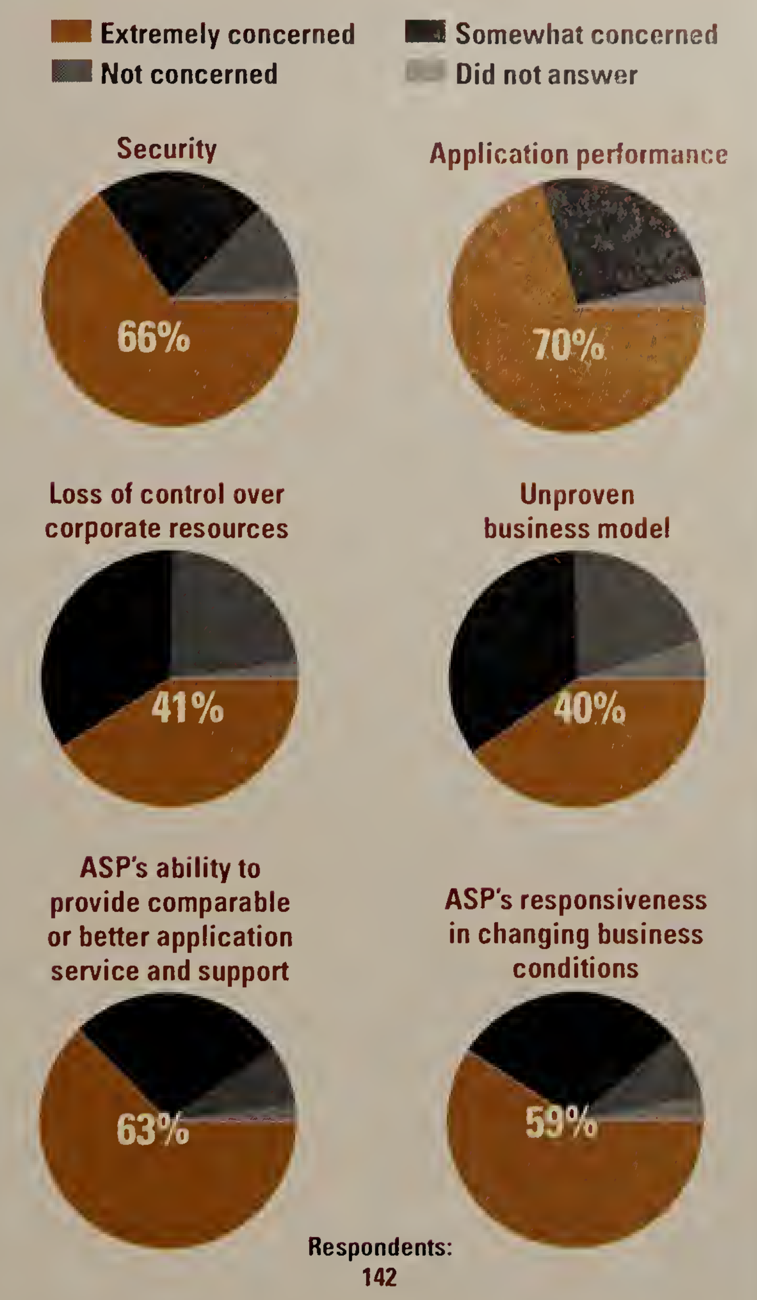
For others, it may just take time.

"If we were ever going to use application hosting, we would need to see the industry mature and stabilize over time," says Mel Kirby, program analyst with the City of Radford in Virginia.

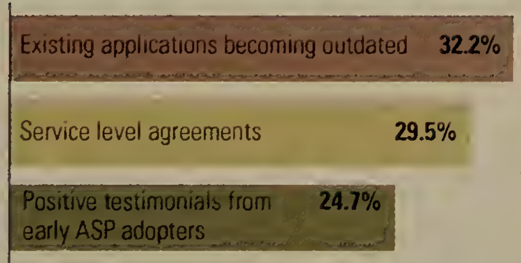
John Cox, Phil Hochmuth and Denise Pappalardo prepared this report.

Figure 2. What keeps you up at night?

How concerned are you about each of the following factors in your organization's decision to use an ASP?



Here are factors that could change some users' minds.



What factors would change your mind about using an ASP?*

About 43% said no factors could change their mind.

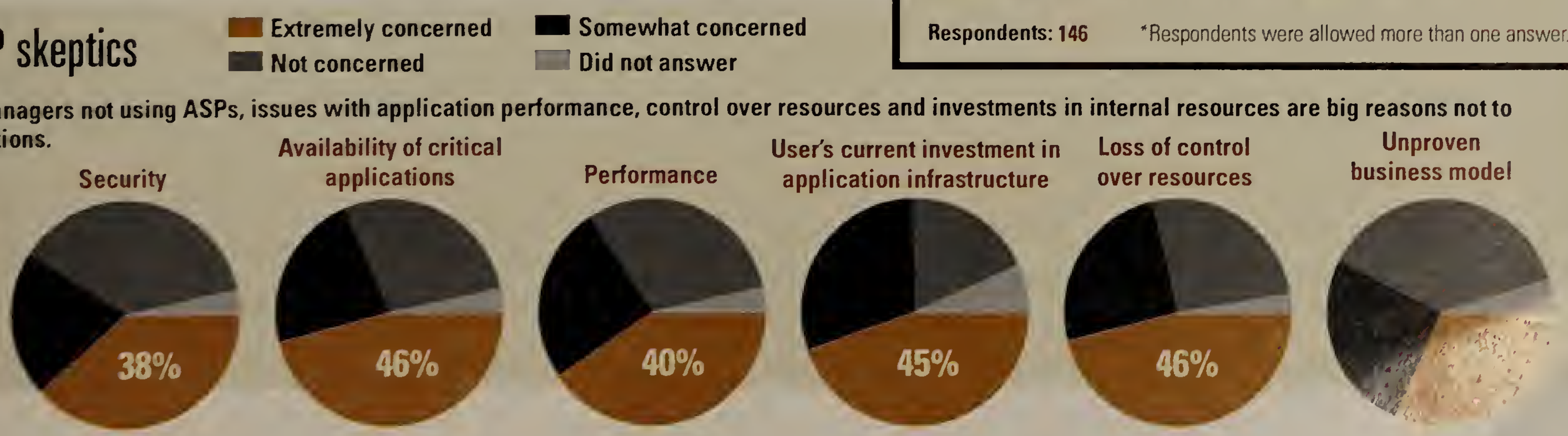
Respondents: 146

*Respondents were allowed more than one answer.

Figure 3. ASP skeptics

According to IT managers not using ASPs, issues with application performance, control over resources and investments in internal resources are big reasons not to outsource applications.

What are the factors in your decision not to use an ASP?



Backspin

Eye to eye with the cat network

"Warning: Cats' eyes removed for the next five miles."

— a commonly seen sign on British public highways.

MARK GIBBS

"Gruesome," you would most likely say when faced with the above sign. "What kind of appalling, unnatural acts are these Brits up to?" Alas — at least for those who might prefer the Steven Kingesque possibilities — in England, where I hale from, we do indeed have something called "cats' eyes," but they are mechanical and can be removed without cruelty.

Cats' eyes are reflective gizmos that return light in exactly the same direction that it comes from. They are used, to great effect, to define the center and edges of British roads, and they are called cats' eyes because the reflection is reminiscent of the reflection from real cats' eyes.

Of course, science has come up with a gruesome — albeit fascinating — use for real cats' eyes. Researchers at Harvard (deas.harvard.edu/~gstanley/research/vision/vis.html) have managed to record the signals from a cat's optic nerves (specifically, the lateral geniculate nucleus) and process them using, according to the researchers, a "linear decoding technique to reconstruct spatio-temporal visual inputs from ensemble responses."

So let's "bottom line" what this is all about: What the researchers managed to do was to record and interpret the neural signals from a cat's eye so that they could figure out what the cat was seeing.

I find "Hum" to be a suitable response. You might go for "Good golly!", "Stap me vitals!" or even some more robust expletive if you so desire, but my preference is for "Hum." You see, the implications of this research are staggering.

But if you think these guys are the first to figure out how to do this, you are probably wrong. I bet intelligence outfits worldwide have delved into this area, and you can bet they went for audio neural impulses first. What are the consequences?

Perhaps there are networks of dogs and cats already wired to spy on the world. Now, I doubt whether embedding a radio transmitter inside an animal's body is going to work — the power requirements would be too demanding and the output too easily detected. Better to record the signals and then transfer them in bulk. (I don't know how — I leave that as an exercise for the reader.)

It would probably be more effective to arrange for relays — another animal that carries a beacon which triggers the spy animal's recorder to send the taped material to the relay's recorder. Cats and dogs would obviously be good recorder carriers, as they get into all sorts of useful places, such as the White House, 10 Downing Street and the Kremlin, while rats would be good relays, as they are always scurrying around in the gardens and walls of such places (assuming that the rats can be distinguished from the politicians).

On a side note, did you know that cable installers sometimes use ferrets to drag cable through walls and floors when access is difficult? They send in the ferret dragging a light line and entice the animal to the target hole using whatever vile food the beast is attracted to. The ferret, in a frantic quest for sustenance, scuttles to the exit and promptly savages the handler, thus restoring balance to the universe.

Anyway, with adequate miniaturization, spiders and flies would be incredible spies, although exactly how you could get them to go where they were needed would be another matter. There is a ton of research potential here (assuming that it hasn't already been done and put into practice).

So the next time that you're having that hush-hush meeting about your forthcoming IPO or takeover of a neighboring country, you might think of kicking Fluffy out of the room. Cats' eyes will never be the same again.

Sightings to nwcolumn@gibbs.com.

'NET BUZZ

The latest on the Internet/intranet industr

PAUL MCNAMAR

Before carving up a turkey the size of Big Bird last week, your humble columnist took time out to thank the Internet gods for a bountiful harvest of "Letters to 'Net Buzz."

Here is a handful of recent favorites:

There were quite a few responses to a column about the San Francisco-based Internet start-up that gave away a Porsche Boxster as first prize in a contest designed to find a better name for the company than **TixToGo.com.** Plucked from more than 100,000 entries, the winning moniker — **Acteva** — didn't exactly wow the *Network World* audience.

My favorite reaction — albeit somewhat self-serving — comes from a network administrator in Savannah, Ga., named **Christian Rekowski:** "I thought my suggestion — ChristianGetsAPorsche.com — was much better."

While the Acteva folks conjured up a convoluted explanation of what the new name means, several readers agreed with the column's contention that the name really means nothing. However, reader Darrell Jones thinks he sees more:

"Perhaps the name Acteva does convey meaning, as in, 'We're only in it for the IPO!'" Jones writes. "Ah, the Bay Area."

This next writer takes the time to butter me up — "Your latest column . . . was entertaining, as usual" — before roasting me over an item about a survey that ranked U.S. cities by the number of people who are connected to the Internet. I had expressed mild surprise at seeing Salt Lake City ranked fifth . . . and then took a gratuitous slap at that fine community's reputation for having a nightlife that reminds no one of New Orleans.

"Your surprise at finding Salt Lake City 'wired' was typical of East Coast airheads, but not the least surprising," **Wes Peters** writes. "Perhaps you have forgotten that the University of Utah was one of the original four nodes on the Arpanet? More likely you never knew that (o much else about the Internet). If I bothered to take anything you write seriously, I'd probably be offended. No worry of that, though."

Imagine if he hadn't found the column entertaining. Wes must not have been too mad, though, because he invited me to attend a Salt Lake Buzz baseball game next time I'm in town.

It should surprise no one that letters to Buzz can be educational. A recent column made mention of an online iteration of the timeless Etch-A-Sketch toy — www.etch-a-sketch.com/html/onlineetch.htm — but lamented the fact that there was no way to "shake" the virtual version to clear the screen.

"I thought I'd let you know that the 'Virtual Etch-A-Sketch' you referred to does have a way to be shaken to clear the screen," writes **Michael Funk,** a systems administrator. "Try using it with Internet Explorer 5. Etch something on the screen and then click-and-hold on the Etch-A-Sketch and move your mouse left to right. It will eventually erase your scribbles just like the real thing!"

Proving one more time that no technical challenge is too daunting for the 'Net Buzz readership.

Once again we will end one of these letter compilations with a line from my favorite correspondent, **Michael Jones** of Coral Gables, Fla., who this time takes exception to a reference I made to President Reagan's infamous comment about ketchup being a vegetable. Mr. Jones apparently believes I was attempting to poke fun at Reagan's struggle with Alzheimer's Disease, when in fact all I was trying to do was poke fun at Mr. Jones.

"Considering Reagan's current disability, sly references to vegetables illustrate the usual serpent-like mental ugliness of the liberal," Jones writes, with yours truly being the serpent in question. "Peering into the liberal mind is like looking into a writhing snake-pit, except that snakes are generally cleaner."

He did not invite me to any baseball games.

Is anyone else ready to take his or her best shot? The address is buzz@nww.com.

All routers are created equal.

Ours just cost half as much.

ACCESS ROUTER COMPARISON		CISCO SYSTEMS	NORTEL NETWORKS
MEDIA	10 Mbps Ethernet	✓	✓
	100 Mbps Ethernet	✓	✓
	Token Ring	✓	✓
	Frame Relay	✓	✓
	PPP	✓	✓
	56K, T1	✓	✓
ROUTING	OSPF	✓	✓
	RIP	✓	✓
	Legacy Protocols	✓	✓
VPN	IPSec	✓	✓
	Firewall	✓	✓
	NAT	✓	✓
	Internet Telephony Ready	✓	✓
	Remote Management	✓	✓
PRICE		$3,895	$1,947

With the escalating cost of routing, why would you pay twice as much for one router over another when they both do virtually the same thing for your network? You wouldn't.

Introducing the Nortel Networks™ Open IP Environment, a new world routing software that embeds routing and other IP functions directly into a variety of hardware platforms and operating systems, making stand-alone, data-access routers an old-world commodity. In other words, we're changing the economics of network-routing technology by driving down the cost. Which is why we're cutting the price of our data-access routers by up to 50 percent below the leading competitor.

You see, our leading, new Open IP Environment software makes routing universally available. Soon, everything from personal appliances to processors and servers will be Internet-routing enabled with more than 75 companies already leveraging Nortel Networks' Open IP technology.

So the next time you're ready to write a check for data-access routers, you might want to ask yourself this simple question: Why pay more? Come together, right now with Nortel Networks. **nortelnetworks.com**

NORTEL NETWORKS

How the world shares ideas.

Cost comparison is based on end user suggested [illegible] configurations. Nortel Networks, the Nortel [illegible] Networks. ©1999 Nortel Networks. [illegible]

How can my business race ahead on the 8-way highway?

The Compaq ProLiant 8000 and 8500 servers have redefined industry-standard technology, yet again. With its revolutionary new 8-way scalable architecture, Compaq brings enterprise customers a new generation of powerful ProLiant servers. They deliver breakthrough scalability, higher levels of reliability and unbeatable price performance for NonStop® e-Business Solutions. They're backed with business-critical Compaq services, tailored to your needs. And, since Compaq co-developed the crucial ProFusion® 8-way architecture with Intel,® no one knows it better. For all the powerful advantages of the 8-way revolution—breakthrough performance, scalability and reliability—there's just one road to take. Details? Visit www.compaq.com/8-way, or call 1-800-AT-COMPAQ.

intel inside
pentium® III xeon™

COMPAQ Better answers.℠